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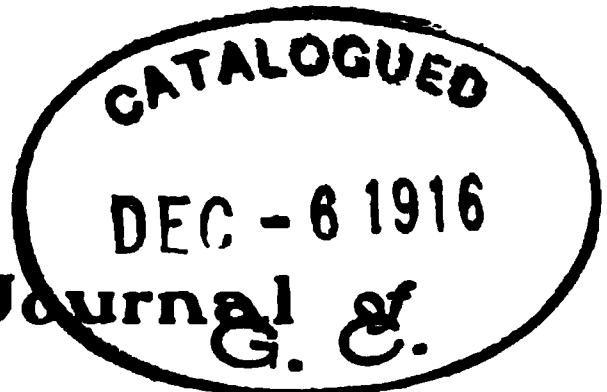
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PREVENTION AND TREATMENT OF X-RAY DERMATITIS.

ACCIDENTS with the x-ray have occurred so often in the hands of inexperienced operators, and occasionally with experts, that the dermatitis has become a bugaboo to the profession at large; and there are noted instances where one unfortunate experience has so influenced the confidence of operators that they have discontinued its use.

The knowledge that these accidents are readily averted by those who understand how to control the condition should give more confidence not only to the operators, but to the profession at large, and lead to its more general adoption. It has been frequently shown that the agents which produce stimulation of the skin, and increase local metabolism, are capable of averting or arresting x-ray dermatitis. Radiant light and heat, the vacuum tube, and effluve discharges, from high potential sources, are capable of producing effects directly opposed to the inhibitory effects of the Roentgen ray. These agents, however, are not to be used therapeutically in connection with the application of the x-ray except under unusual conditions. The knowledge of their counteraction should be kept in mind, and they should be employed at any time when there is the slightest indication of a possible unfavorable dermatitis from x-ray exposures to arrest it, that no further extension of the process will occur.

The measures referred to are promptly efficacious, when employed after the usual series of therapeutic application of the Roentgen ray, but are not applicable to the atrophied conditions in which keratoses are found, on the hands of physicians or others who have been exposed too often and for several years to x-ray exposures. The atrophied and inactive condition of the skin in these cases, together with the arrestment of the perspiratory function, will not react, but, on the other hand, seem to be more or less aggravated by these applications.

The most valuable of the measures referred to is the combined radiations from either an arc or incandescent lamp applied to the surface that has been irradiated, which elicits exactly the opposite effect to the inhibitory action of the Roentgen ray.

The applications should be made daily to the extent of inducing a marked degree of hyperemia, and in severe cases should be repeated twice daily until the dermatitis subsides. These measures are of great value as a safeguard against accidents from x-ray dermatitis, and should be employed as a prophylactic measure in all cases when several exposures have been made for purpose of diagnosis.

THE TREATMENT OF NEPHRITIS.

A PROCESS of congestion in the kidney, whether interstitial or parenchymatous, is associated with a degree of infiltration which aggravates the process, and renders the disease chronic, with a tendency to progressive degeneration.

Those who are familiar with the actions of the static current and its property of removing infiltration will readily appreciate the possibilities of relieving the congestion of an inflamed kidney. Placed as the kidneys are, just beneath the muscular structures on either side of the spinal column, the application of the static wave current over the parts will readily affect the structures of the kidney, removing the infiltration in practically the same manner as from the structures of an inflamed joint. The result from treating these cases in this way is very gratifying, if instituted before the process has caused too great destruction of the structures of the gland.

THE STATIC BRUSH DISCHARGE IN THE TREATMENT OF CHILBLAINS.

THERE is probably no more tantalizing affection than chilblains, and there is no method of relieving the condition so promptly and efficiently as with the static brush discharge or the direct static vacuum tube current applied until the soreness is relieved. One or two thorough applications to the parts affected will often cut short a season's discomfort.

OBITUARY.

Francis Howe Munroe, M.D., died at his home in Newark, N. J., on November 29th, from cerebral hemorrhage, aged 48. Those who were present at the last meeting of the American Electro-Therapeutic Association, and heard the very scientific and practical report of the Chairman of the Committee on Thermotherapy and Hydrotherapy, will be shocked to learn that one who seemed so well should be so soon taken from his active and useful field of labor. For more than three years Dr. Munroe has been Editor of the Department of Thermotherapy of the JOURNAL, and the Editor and readers have reason to be thankful for his efficient services. As a scientific investigator he was earnest and indefatigable. As a friend and associate he was always responsive and faithful. In his home he was devoted, loving and gentle. In each place he will be greatly missed.

THE TREATMENT OF INFLAMMATION NOT COMPLICATED OR CAUSED BY INFECTION.*

BY WILLIAM BENHAM SNOW, M.D., NEW YORK.

No more important subject is presented to the clinician than the treatment of inflammation—Nature's effort to repair some injury done or to ward off some process of infection. Very nearly all disease is associated sooner or later with inflammation.

During the ages that have passed, even to the present day, the dictum has been to follow Nature in the treatment of disease. The fact has not been generally recognized, and from present indications will not for some time to come, that Nature's way is not always the best way, and that very often the indication is directly contrary to what Nature does.

In the theme under consideration the method which is eminently successful in the hands of all who employ it intelligently is directly contrary to the older teachings, which taught that tissue rest which nature effected with muscular tension or contraction was imperative. There are thousands of ankylosed joints which bear testimony of preceding months of suffering. Tissue rest is never justifiable except when parts are fractured, or when active infection is present in the joint or other tissue. Then, as previously shown by the writer, rest with the induction of active hyperemia and the employment of other means for the destruction of the germs is the positive indication—another method which exceeds Nature's provisions.

The vaso-motor mechanism provides that when a part demands nutrition, or when heat or cold is applied to a part, an increased passage of blood to or through the tissues improves nutrition and equalizes the local temperature, as also when an injury occurs blood is determined to the location of the injury. In case of injury the flow of blood which is naturally supplied to control a healthy mechanism: because the reflex stimulation is exaggerated, so greatly increases the determination of blood to the affected region that swelling occurs as the natural effect of engorgement. The capillary resistance first

* Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association, at Saratoga Springs, N. Y., September 14th, 1910.

slows the stream and the tissues become gradually engorged. The swelling once begun increases, and the pressure induced by the swelling more and more impedes the exit of the blood stream through the afferent channels, while the efferent influx persists and the swelling increases.

The mechanical conditions of the obstructed blood stream may well be compared to an ice gorge which persists until some provision is made to disengage an involved region, or the tissues break away with a hemorrhage into the subcutaneous tissue. Otherwise the condition of *stasis* persists, and then follows the process of diapedesis, infiltration and later organization of the exudation with hyperplasia, or degeneration of a portion of the tissue elements involved. In the case of a traumatic injury, this state of things is peculiarly unfortunate, because it can by proper means be promptly dissipated, as is also the case in the early stage of infection. The walling in of the germs of infection, after an aggregation have propagated, is a beneficent action; whereas if at the outset the small starting point of an infectious process were not walled in the phagocytic or other resisting functions of the organism would destroy it in the early stage, when the germs were few.

It is then a fact that the recovery from inflammatory processes by the natural provisions of the organism are retarded, as the result of the determination of too great quantities of blood into the tissues, which have become engorged, aggravating the inflammatory process with development of swelling, which induces pressure and pain, redness being an index of the presence of blood in the tissues, and heat the reaction of the tissues in the effort to become disengorged. In other words, here nature requires assistance. As the obstructing ice of the ice gorge must be blasted out, so a *vis a tergo* is demanded in the early stages of all inflammation of mechanical or chemical origin.

Stasis is the obstacle to nature's management of inflammation. Arising by a natural process, it is the chief impediment to recovery. That the medical profession have failed to look at it from this point of view is evident to one conversant with the employment of means which do result in the prompt removal of the process with rapid restitution and recovery, which always avoids the production of scar tissue or hyperplasia.

The class of conditions which are included in these observa-

tions are those of direct mechanical origin, as sprains and contusions; and those in which from various causes an obstructive non-infectious inflammatory or infiltrating process has been instituted, as in dysmenorrhea, subinvolution, prostatitis, phlebitis, congestions of the abdominal glands, and similar conditions.

Nature's method of treating inflammation as suggested by Adami, is fixation by the establishment of tension or contraction of the muscles which cross the joint, the joint becoming immobilized, a condition favorable to, and if left to Nature, certain to result in ankylosis; fibrinous exudations and plastic materials thrown out effecting adhesion of the articular surfaces of the joint. No case better illustrates the fact that Nature is not always fully successful, or the certain necessity of some form of intervention other than immobilization to save the usefulness of a joint. In the writer's experience, and what he has seen of the work of others, no greater error can be made than to fix an inflamed joint, the seat of a simple inflammatory process, the result of an accident or toxæmia, for thereby ankylosis is favored and a loss of time in restoring the parts to normal. When an accident of this sort occurs, the establishment of *stasis* with induration brings about a cessation of metabolism and nutrition in the inflamed area, and the pathological study of the diapedesis and infiltration that occurs under certain circumstances, instead of indicating the presence of repair, is the indication of a process of degeneration under conditions of obstructed or impaired metabolism.

These statements are made with a full knowledge that the opposite views have been long entertained, but based upon the results obtained by the employment of active methods instead of rest, in the treatment of many hundreds of cases of inflammation, in which prompt resolution and restitution have taken place. The indication as we wish here to demonstrate, and which will be demonstrated by any fair-minded observer, who will employ the same means as outlined in the treatment of the simple condition described by Dr. Adami, of an injured knee or ankle joint is as follows: Recognizing the fact that the longer a condition of induration is allowed to persist, the greater will be the extent of the swelling, pain and redness, and that the tissues will be in a condition of *stasis* which will result in diapedesis and infiltration, the first indication is to

dissipate the first approach of stasis as soon as possible, and thereby restore the impaired circulation, because restitution cannot take place when metabolism is impaired by the presence of stasis. In the very early stage a means such as the application of radiant light and heat or dry heat, by dilating the superficial vessels and capillaries, enlarging the channels of circulation through the capillaries and small blood vessels, makes possible the escape of the inflowing blood, and arrests the establishment of stasis. When the induction of such hyperæmia, however, has been delayed, and stenosis is already well established, more active measures will be required—energetic means which will act as a *vis a tergo*, and force out the accumulation through the closed channels, lymphatic and vascular, and disengage the tissues.

In a paper read at Buffalo in 1901,* the writer was the first to call attention to this principle, which he has since employed and advocated, and which has been recognized and employed by a large number of medical men with the same success that has always attended their use by the writer. In this paper it was stated that the previous dictum of the medical profession, that electricity should not be employed in the treatment of acute inflammatory conditions in the earliest stages was an error, because its proper employment effects an early dissipation of the inflammatory exudate, softens the involved tissues, and brings about promptly a restitution to normal of the circulation and metabolism.

Returning to the consideration of a simple case of sprained ankle or knee, the systematic proper application of the static current at the first administration softens the exudation, relieves the pressure and consequently the pain; relaxes muscular tension, and restores motility and utility to the joint. The patient who comes for treatment on crutches walks out without them with little or no pain, and unrestrained in his directions as to rest. An individual in such condition should return for daily treatments, with the result of a complete restoration of the affected part within a week, without an evidence of having had an inflammatory trouble. This will be the result in all cases in which there has been no solution of con-

* The Effects of Electro-static Modalities upon Hyperemia and Pain, for March, 1910.

tinuity of the ligamentous or bony structures of the joint, when they come under observation within 24 or 36 hours after such accident has occurred. The same principle applies to the treatment of every similar inflammatory condition not the seat of an infectious process.

The best means to be employed for the relief of local inflammation in which infection does not enter as a factor are the application of the *static wave current, the static sparks, the static brush discharge or the direct vacuum tube static current*, singly or conjointly. Either one of these modalities are capable of removing superficial affections. If, however, the deep structures, of an enlarged joint are involved, or other deep-seated structures, the best means for relieving by inducing tissue contraction of such deeply located tissues is the application of the long static sparks. The static brush discharge is applicable to all superficial inflammations, including sprains of the hands and fingers, and other small joints, and to all inflammatory conditions involving the skin, face and scalp. The static wave current is adequate for relieving all moderately deep inflammatory conditions. The size of the metal electrode for internal or external use, and the length of spark gap should be regulated to bring about the requisite degree and depth of tissue contraction, while, as stated above, the static spark is indicated in deep-seated inflammations. The direct vacuum tube current administered with a vacuum tube connected and operated as the static wave current is with the static machine, is capable of producing similar effects of diffuse tissue contraction, but is generally confined to the treatment of the cavities of the body and of superficial inflammation.

The principle of action of these static currents depends upon the compression of tissue induced by diffuse *intrinsic* contraction when applied to the tissues involved in the inflammatory process, which action in and of the involved tissue with a gentle but positive force expresses the exudation through the channels of elimination, particularly by way of the lymphatics, carrying with it the infiltrating materials, including round cells and other degenerating tissues from the lymph spaces in which they have accumulated; and co-incidentally, by relieving the pressure upon the veins and capillaries, permits a return of the circulation and metabolism with stasis removed.

The prognosis as to the time it will require to thus remove

statis will always be relative to the promptness with which treatment is instituted after injury has occurred, so that, in the early cases of neuritis and synovitis, an early application is entirely effective in from two to five days, varying with the extent of the affection and the interval before treatment. In chronic inflammation it is not, as suggested by Dr. Adami to be said that "there is not any direct treatment;" for, on the contrary, with persistence it is possible not only to relieve the infiltration in acute inflammation, but to bring about the elimination of all the accumulated debris, except the hyperplastic or scar tissue which has become organized in chronic cases. This type of tissue, however, may often be resolved by the local administration of the Roentgen ray, as in the case of scar tissue in the ordinary surgical keloid and often of fibroid tumors. That these facts as here set forth are not to the present time recognized by the large majority of practitioners is due to their unfamiliarity with the methods employed, particularly as to the thorough technique required to effect uniformly good results. So easy, however, is it to demonstrate their efficiency that he who doubts may prove the truth or falsity of these statements if he will employ the proper technique.

It is not too bold to claim that if the principles here enunciated are systematically employed in the practice of the profession at large, that the principles will be generally recognized and adopted.

The writer, in accordance with these principles, has during recent years introduced methods of treating inflammatory conditions.

In prostatitis and seminal vesiculitis, a method which was first employed and published by the writer, the results have been most striking and satisfactory. While it is not possible always to relieve the bladder irritation when due to internal bladder conditions, there are very few cases of prostatitis which are not practically cured by the method which has been employed by myself and others since the treatment of the first case more than eight years since. During this time the writer has treated with success upwards of 125 cases of this distressing condition, and now feels justified in saying that there are very few of these cases that need ever go to an operation, only possibly those in which fibroma has developed.

The method has been so often described by the writer and others that it is unnecessary to dilate upon it in this paper, only to say that the static wave current with the metal electrode, employing a spark-gap averaging from three to five inches with a slow interruption for 20 minutes daily at first, and later on alternate days, obtains a uniform result.

Dysmenorrhea and subinvolution were first treated by this method by myself and my wife, Dr. Mary Arnold Snow. The uniformity of results by this method, applying the electrode through the rectum in practically the same manner as in the treatment of prostatitis, has proved successful in upwards of 75 cases in our own practice, and has been verified in the writings by Dr. Edward C. Titus, Dr. Herbert F. Pitcher, and other observers.

Urethral caruncles are uniformly relieved and cured by the application of the same method or by the employment of glass vacuum electrodes with the direct vacuum tube current, when the structure is not hyperplastic but an inflammatory infiltration.

Neuritis as treated by the combined method, employing the static wave current and the static sparks, were first so employed by the writer, and have been uniformly successful in my hands in the treatment of upwards of 400 cases by this method, and 65 cases of acute sciatica of less than two weeks' duration have every one been cured within a period of two weeks, most of them within ten days. An interesting observation during the last year by the writer in cases of intra-pelvic neuritis, in which the sacro-iliac synchondrosis has been slightly sprained or misplaced, the condition described by Goldthwaite, is that uniform success is obtained in the treatment of all early cases by the external and internal employment of the static wave current, employing a metal electrode such as is used for the treatment of prostatitis, for the internal application. Many cases of intra-pelvic neuritis are due to prostatic or uterine pressure, and are practically relieved by the reduction of the condition which is causing it.

Brachial neuritis, herpes zoster, and intercostal neuritis are successfully treated by the same method, requiring only the localization of the lesion and the application of the wave current and static sparks to the site of the lesion and the contracted muscles.

In ticdouleureux and Bell's palsy, often of common origin, success is uniform in the early cases. We have treated ten cases of ticdouleureux, each of less than a year's standing, which have been successfully cured by the application of the static wave current and the static brush discharge over the region affected.

Anterior poliomyelitis by the method which the writer first adopted in 1900 has been so uniformly successful in our hands that we can urge the thorough and systematic employment of the method. The lesion is acknowledged to be a local infiltration and congestion involving the anterior cornua of the spinal cord, whatever the cause. The infectious inflammation, which authorities, seem to have recently deconstructed, subsides within the first days of the disease, leaving an infiltration pressing upon the neurons, which must perish if not relieved. That such relief is possible by the employment of the static wave current with a narrow spinal electrode applied over the site of the lesion has been demonstrated by the writer and others in many cases. So effective is this method that it seems in but rare cases could failure result when the patients come early under observation. The local treatment of the paralyzed muscles, except from the point of view of maintaining nutrition for the purpose of preventing rapid atrophy so characteristic of cord lesions, offers nothing for the relief of the central lesion.

Rheumatoid arthritis was first treated by the author by the combined use of the static wave current and static sparks, as reported at the meeting of this Association at Washington in 1899. The statements made at that time, though seriously questioned, have been frequently verified in the writer's experience and by others. A larger experience and the better understanding and adoption of other methods has improved the method, adding the employment of radiant light.

Discussion.

Dr. Herbert F. Pitcher, of Haverhill, Mass.: If Dr. Snow never accomplished anything else in the world but to introduce his method of treating congestion and inflammation of the prostate, his name should be immortal, because I think of all the troubles that middle-aged men are prone to, that is one of the most distressing. It is a condition from which they suffer for years, and eventually have to submit to an operation, from

which there is great danger. I have almost come to feel confident that I can cure all cases of enlarged prostate where it is due to a chronic congestion, especially the large spongy conditions that interfere with micturition and cause disturbance at night and even dribbling by day, or retention of urine. They can all be reduced in so short a time and so painlessly and easily, that it is a great satisfaction to treat those patients. I think we should make a distinction between the *chronically congested prostate* and *hypertrophy of a fibrous nature*. The latter can be relieved to some extent with the high frequency current and the vacuum tube, but many of these cases cannot be benefited except by operative measures.

Dr. G. Betton Massey, of Philadelphia: I wish to endorse everything Dr. Pitcher has said, although it is somewhat out of my line. Dr. Boardman Reed, one of the members of this Association, bequeathed a patient to me several years ago on going west, whom he was treating for prostatic enlargement with the wave current, and asked me to continue it. I had had no experience with the method until that time. I continued the treatment outlined by Dr. Reed, which was practically the vacuum tube treatment, with very good success. Sometime after that a typical case of enlarged prostate appeared, and I modified the treatment by employing the wave current and by having the electrode not held by the patient or any one, but by the muscles of the rectum. I had an old rectal electrode, from which I took the handle and the heavy binding post, about six inches long. I insulated this short electrode to within two inches of the end and well up into the shaft with black sealing wax. And then in order to have the instrument as light as possible I made the conducting cord of a very light No. 30 wire, simply twisting it around the thread at the end, and carrying that to the appropriate pole of the static machine. The result was that when a certain force was used the rectal muscles would grasp the electrode and pull it in, and that was a guide to me as to the right amount of current. That case was more markedly improved. In another case, a man of about fifty, with all the symptoms of a beginning prostatic trouble, there was an apparent cure. Since then I have had a number of cases, equally interesting and radical in results. I did not know that Dr. Snow had actually introduced this method. I knew he had advocated it. This method alone is enough to carry his name down through the ages.

This very warm commendation is after using the faradic current and galvanic current in the same kind of trouble for years. A few years ago I read a paper on the treatment of the prostate with the galvanic current where I used it in the urethra, and thought the patient was going to die from too much current. Later I met him on the street, and he said he was very much improved. He was a man of seventy-three. On the strength of that I read a very glowing paper, but never could duplicate the results.

Dr. S. St. J. Wright, of Akron, Ohio: Our President in his address stated that there is a microscopic amount of electricity generated by the cell. Dr. deKraft gave us the clinical history to show wonderful clinical results, and Dr. Law showed how the results were obtained. Dr. Snow said that Nature was not always a good doctor. There are four different statements. Let us see if we can make them harmonize and see how we get freedom from pain. The positive galvanic pole produces acid, and is soothing and healing. An acid medium soothes pain and destroys bacteria. Your oxygen is hurried to the scene of trouble in inflammation. You have increased muscular action, in the throb of the arteries you have increased physical processes, with the increased production of electricity. The X-ray put through the Gasserian ganglion will produce such changes as to relieve the pain of the patient. We do not assume that there are any bacteria there, but your patient gets well with a few flashes of the X-ray, and that is a fact in relation to all these other facts. We have the oxygen, the electric current of high frequency, the X-ray. Either of these modalities produce ozone and nitrous acid in the blood, which is freely poured into the infected spot. Nature is a wonderful healer, and we are imitating Nature in using the electric current. Nature has produced an increased activity which is inclined to produce a little current. The X-ray sterilizes the bacteria in the test tube. It produces the same result there, it acidifies it. I see no conflict between our methods and Nature's methods. The history of the mistakes of mankind is a history of going contrary to Nature. Electro-therapeutics is the most natural treatment of certain states ever devised by mortal man.

Dr. Charles O. Files, of Portland, Me.: If the argument that Dr. Snow used is true in regard to inflammation, and I

think it is from my experience of many years, I think that a great mistake is made in the treatment of cases of fracture. There is a period of ten days where there is nothing doing in the case of fracture, and if an electric wave current is used at the time of a fracture, there would be a prevention of the swelling, and some days would be saved in the length of the cure. I do not see any getting away from that, if his argument is right, and I believe that the treatment of fractures by electricity would shorten very materially the time of treatment after the fracture is set.

Dr. J. J. Kindred, of River Crest, Queensborough: I did not understand that Dr. Snow sufficiently differentiated his cases of prostatitis. Perhaps I did not catch what he said clearly on that point. I would like to have him elucidate and make clearer to us whether he finds the spongy form, the infectious form or the fibroid form more readily responds to the static treatment, which I understand he prefers.

Dr. Edward C. Titus, of New York: I would like to add my small mite to what Dr. Snow has said. I think he has defined very clearly the inflammatory processes, and given us a clear description of the physical means of treating these cases. Those of us who have had experience with these methods can fully verify his conclusions. It is astonishing and yet so satisfactory that one is almost enthusiastic at the results obtained by the employment of these physical means in the relief of congestion or stasis even when it has extended almost to the point of inflammatory reaction. Dr. Snow has described the disturbed physiological condition that results from irritation, and the natural physical relief obtained by his methods are, I think, the foundation stone for the treatment of many of the conditions which we are called upon to relieve that are not amenable to the ordinary medicinal remedies or to the treatment by rest, which heretofore are precedent in managing these troublesome conditions. I thank Dr. Snow for the clearness with which he has stated the principle of his paper.

Dr. Snow in closing: I wish first to thank Dr. Pitcher, Dr. Massey and Dr. Titus for their kind words, and to say that if this contribution is valuable, I am only too thankful that I had the good fortune quite accidentally to discover it.

I have no word to say against Nature. I only say that the

tendency of Nature is to cure a joint by ankylosis, and she always cures a joint in that way, if the inflammation is severe. The limb is useful, but the joint is not movable. Furthermore, the suggestions of Dr. Wright with reference to the roundabout way of getting electricity into the joint by Nature does not exactly appeal to me as affecting the condition, although the effort might be there. It is not my purpose to decry Nature, but there would be nothing for us to do if Nature were always capable. We must help her. But to meet these conditions of stasis there is no provision of Nature. The steady impulse and beating of the heart on the distal side is not calculated to overcome stasis. Hyperplasia and thickening are the result of Nature's inability to overcome extreme conditions with the means with which she preserves the equilibrium in health.

In answer to Dr. Kindred, I do not consider any exceptions to prostatitis, except the suppurating, tubercular, and malignant cases and the fibroid prostates. Those are the only cases not treated in the manner described. It makes no difference whether the prostatitis is of specific origin or a simple congestion. The specific cases do as well as any. There is another method of treating tubercular prostatitis, viz.: by the X-ray and high frequency currents, which is likewise successful. I have never yet had a case of malignant prostate to treat. In all of the cases reported I have had only three cases of fibroid prostate. There was but one tubercular case, and that I cured by the method referred to. The specific cases are not only cured by the seminal vesiculitis often present with the prostaticitis is also cured. I think the cure of vesiculitis by the combined high frequency treatment and the static wave current is one of the most remarkable and valuable things in this treatment, because it puts a new aspect on the therapeutics, as removing, I may say, that awful condition which condemns so many women to chronic invalidism.

Dr. Massey: What pole do you use? I have been in the habit of using the negative, but I believe I am wrong.

Dr. Snow: I suppose the mechanical effect is the same, but I use the positive. That has been my custom, and I think it has been demonstrated by many of us that some aggravation is apt to follow the use of the negative polarity. I noticed it in my work and stopped it. The positive has always served the purpose.

REPORT OF A CASE OF SPLENIC LEUCÆMIA
SUCCESSFULLY TREATED BY MODERN
METHODS.*

BY C. W. STROBELL, M.D., RUTLAND, VERMONT.

Splenic Leucæmia, referring hereby to the Spleno-Medullary, or Myelogenous type of the disease, is a disease of the blood, characterized by an enormous increase of leucocytes, derived, more particularly, from the red bone marrow; together with a relative diminution of the red blood corpuscles. There is also a relative decrease in the proportion of hæmoglobin, along with diminished alkalinity of the blood, and increase of its fibrin constituent.

Prominent clinical symptoms of this type of leucæmia are: rapid emaciation, marked pallor, breathlessness, languor, extreme weakness and dyspnœa. Gradual, and sometimes enormous, enlargement of the spleen, accompanied with varying degrees of distress or pain; together with gastro-intestinal, and circulatory disturbances, which are also clinical features of the disease.

The prognosis, as given in the standard medical text-books, is most gloomy and unfavorable. Quoting Anders, most cases prove fatal in from one to two years, while in acute cases death may occur in two months from the onset.

The case I have to report is that of Mrs. W., widow, age 55, native white. Mrs. W. gave a history of chronic menstrual disturbances, until her menopause, which occurred at the early age of 26. Mrs. W. had always been a hard worker, and she had also not known a well day for twenty years. This patient had never been afflicted with any acute disease, nor had she ever been told by her physician, at any time, that she was suffering from any chronic ailment, hence had concluded, and rightfully, that her ill health was due to overwork and worry. Patient also stated that for years she had been troubled with a sense of suffocation, upon assuming the reclining position. Mrs. W. presented a very emaciated appearance, having lost nearly seventy pounds within the past few months. She had to be assisted into the office, and complained of great weak-

*Read before the American Electro-Therapeutic Association, at Saratoga Springs, N. Y., September 14th, 1910.

ness and dyspnoea. Great pain in the left hypochondrium was also complained of, dating from about six weeks prior to the consultation. Gastro-intestinal disturbances, including constipation, were prominent subjective symptoms. Objectively the patient presented a pale, pinched, drawn and jaundiced appearance; the eyeballs having a distinctly yellow cast. The tongue was large, flabby, indented, and covered with a heavy, dark brown fur. The figure was bowed and aged 25 years beyond the normal.

Physical examination disclosed a spleen, enlarged to the size of a man's head, considerably distending the abdominal wall, and impinging upon the iliac crest. Efforts made to dislodge the organ from its bed, caused the patient much pain. There was no enlargement of the liver nor lymphatics, and there were no symptoms indicative of extensive bone involvement, as would be evidenced by tenderness, swelling, irregularity, or deformity. The edge and notches of the spleen, together with its smooth, firm surface, were easily mapped out, through the attenuated abdominal muscles.

Pathologist's urinalysis negatived renal involvement.

Pathologist's blood examination, made June 17th, 1910, shows: hæmoglobin 70 per cent.; red cells per cu. m.m. 80 per cent.; white cells per cu. m.m. 230 per cent.

Differential blood count showed lymphocytes (small and large) 14 per cent.; polynuclear neutrophiles 16 per cent.; eosinophiles 7 per cent.; eosinophilic myelocytes of white small cells (from bone marrow) 50 per cent.; mast cells 3 per cent.

Treatment.—Fowler's sol. of arsenic was prescribed, in ten drop doses, after meals, together with 5 grains of Blaud's iron mass. In addition, to stimulate elimination, 5 grs. Hg. Mass. and one improved C.C. pill (U. S. P.), were ordered to be taken each night, upon retiring. The action of these remedies was closely observed, and changes in dosage made, as indicated, from time to time.

On the first day of treatment, x-rays from a Mueller, No. 3, high vacuum tube were directed toward the splenic enlargement, for 12 minutes, the area irradiated being protected from the injurious effects of the soft rays, by a sheet of tea lead.

The next day the patient was given an electric hot pack, about the body, extending from beneath the armpits to the pelvis, the object being to induce an intense hyperæmia of the

abdominal viscera. This treatment was prolonged for 20 minutes.

On the third day, chlorine cataphoresis was employed, using a 2 per cent. sol. of sodium chloride on the negative pad. This treatment was prolonged for 30 minutes. The negative pad covered the entire splenic enlargement, while the indifferent, or dispersing one, covered half the back. 400 milliamperes of the direct current was permitted to flow through for a period of 30 minutes. This process was painless so long as there was good contact between the electrodes and the skin.

On the fourth day I reverted to the x-rays again, employing the same dosage and degree of vacuum. The fifth day electric hot pack was administered precisely as before, and the next chlorine cataphoresis once more, and so on in regular rotation. Each seance was concluded with ten minutes of static insulation, the patient being seated upon the platform and connected with the negative side of the machine, the positive side being grounded. A three inch spark gap was employed. The patient was required to rest in the reclining position for a half-hour after each daily treatment.

It was quite remarkable, and withal inspiring, to note the rapid progress of this case toward recovery. By the end of the fourth week, the patient declared she had not felt so well in twenty years. Indeed, it was only with some considerable persuasion that she was induced to continue the treatments.

At this time, July 9, 1910, the pathologist's report on the blood examination was as follows: hæmoglobin 80 per cent.; red cells 81 per cent.; white cells 210 per cent.; lymphocytes 18 per cent.; polyneuclear neutrophiles 61 per cent.; eosinophiles .05 per cent.; myelocytes 15 per cent.; mast cell .01 per cent. The spleen had diminished fully two-thirds in size. The pain had all left her by the end of the second week of treatment. In place of the dragging, weary gait, of the first appearance, the woman had resumed her accustomed rapid nervous stride. The pallid, distressed and hopeless look had given place to a cheerful smiling countenance. The bodily weight had increased 12 lbs. The following two weeks treatments were on alternate days, the improvement continuing, though at a less rapid rate, and as the patient begged to be allowed to resume some of her regular duties she was permitted to do so. At

the end of the second month the spleen was scarcely to be felt, and the patient declined any further treatment, saying, as she came in after a week's absence, that she "felt like a girl again," which spontaneous expression tells its own story, of the successful modern treatment of this form of Splenic Leucæmia.

Discussion.

Dr. Thomas H. Cannon of Baltimore. I would like to ask the Doctor a few questions as to the blood findings. In the pathological reports that we have prepared at the University of Maryland Hospital we had several marked cases of acute myelogenous and splenic leucæmia. The one described by the Doctor seems totally at variance with the majority we have come in contact with, since in leucæmia with a spleen the size of this one the blood does not contain 80 per cent. of hæmoglobin on account of the increase in the large cells. The Doctor did not say that the pathologist's report showed any myelocytes in this case. A case that resembled this one was a case of malaria. The blood was negative. After persistent efforts we found the estivo-autumnal form of malaria, and it gave the same symptoms of pallor and chill as the case which the Doctor has related. I think the report should have been looked at from the pathological point of view for the myelocytes, the nucleated red cells and the malarial parasites.

Dr. Strobel in closing said that he had distinctly reported the presence of myelocytes.



REPORT OF THE COMMITTEE ON STANDARDIZATION.*

WILLIAM BENHAM SNOW, M.D., CHAIRMAN.

The survey of the year's progress in physical therapeutics marks a movement toward a more general tendency to the adoption of a rational standardization away from irrationalism and empiricism. However, some recent contributors to the literature, particularly to that on electro-therapeutics, have shown a disposition to drift on in the empiric path without due reference to the relation of the physical and physiological actions of the physical modalities as applied to the treatment of pathological conditions.

Therapeutic indications, as shown in the previous report of your committee, comprise:

1. The regulation of metabolism with the maintenance of or restitution to a normal standard of the functions of secretion and excretion, and the conservation of the physical energies.
2. The destruction of germs in the organism is the first step towards the relief of the infectious type of inflammation.
3. Provisions of proper nutrition for the maintenance or restitution of body weight.
4. The correction of the processes of congestion and the relief of consequent muscular spasm, and for the control of arterial tension.
5. The removal of malignant growths, neoplasms and other local irritating and cosmetic defects.
6. The correction of physical conditions which lead to or induce functional perversions, or derangements of the mind and nervous system.

The correction of these physical and mental defects, as previously shown, must depend for success upon the efficiency of therapeutic measures employed, together with the institution of prophylaxis and the correction of environment.

The certainty with which so-called physical measures meet therapeutic requirements in most conditions in which struc-

*Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association at Saratoga Springs, N. Y., September 13th, 1910.

tural changes are not far advanced, is most encouraging. It makes the life of the physician well informed in their principle of action and methods of employment an ever fruitful source of pleasure and satisfaction, because he finds himself able to accomplish so much for the sufferer which by other methods is impossible.

In claiming so much for physical measures, your committee is not unmindful of the influence of environment and social relations—employment and entertainment—in their influences upon the individual as causes of disease as well as means to be considered for its relief. These and the employment of serum therapy and drugs in their places, fill an added role in therapeutics which are accepted by all well-informed practising physicians.

The numerous modalities, electrical and others, included in this report, are (1) the electrical, including the constant, the induced, the sinusoidal, and the high potential currents of high frequency and high and low periodicity; (2) radiant light and heat; (3) convective heat, which includes the effects of hydrotherapy and dry, hot air; (4) mechano-therapy; (5) areo-therapy; (6) diet-therapy, and (7) the Roentgen ray.

The standardization of physical therapeutic measures must consider recognized established indications for the employment of each in therapeutics, which must accord with indications to be met, effects produced, upon conditions to be treated. In order to treat this subject scientifically, the relative action of the various physical modalities must be considered in order to determine how they best meet the individual indications.

The value of a physical measure for correcting a pathological or impaired physical condition depends upon the reaction or tissue response it induces and the effects wrought upon the condition in question. The consideration, therefore, of the various modalities and their specific indications in therapeutics must depend upon their capacity to produce certain definite reactions or results.

Responses, reflex to the administration of physical measures in therapeutics, as indicated are as follows:

1. *Hyperemia* is induced with a view to increasing local metabolism, local nutrition, and phagocytic resistance against infection, together with the increase of oxidation associated with the presence of oxygenized arterial blood in the tissues.

2. *Tissue contraction* is induced for the purpose of forcing out from involved tissue the accumulated exudations and infiltration, the products of inflammation; and the relaxation of muscular spasm for local relief, thereby permitting a return of circulation and metabolism.

3. *General metabolism* is induced with a general increase of cellular activity, including increased function of the glandular structures.

4. *Relaxation of arterial spasm* will relieve arterial hypertension.

5. *Stimulation of deep cardiac, respiratory, and other automatic centers* is effected.

6. *Inhibition of excessive function* is affected.

7. *Malignant and other neoplasms and blemishes* are often removed.

8. *Micro-organisms* present in the system are often destroyed.

9. *Nutrition is maintained* by the regulation of food to the actual demand of the system.

10. *Ionization* includes electrolysis and the processes of phoresis and electro-medicamental, metallic diffusion, or the process of transmission by dissolving metallic substances by electro-chemical combination with the chlorides of the blood into oxychlorides. In other words, ionization is the transmission into the human body of substance with the electric ions for the purposes of destroying or altering the action of the tissues.

Hyperemia: The thermic action of various modalities, electricity, radiant light and heat, convective heat, and cold (strictly speaking, variations in temperatures), besides the application of measures, which produce a distinct stinging or irritating action at the periphery as high potential electrical discharges such as the effleuve or vacuum tube discharges, the constant current, and mechanical stimulation by exercise and mechanical vibration, are all measures capable of inducing *local hyperemia*; and the general heating effects of body applications of heat and cold and high potential electricity, and the constant current in the electrical bath, are capable of producing *general hypermia* of the skin.

The passage of high potential currents of large amperage through the tissues, as of the direct d'Arsonval current, are

capable of producing a high degree of temperature in the tissues between two electrodes. The administration of the d'Arsonval current by the auto-condensation method and the static wave current are also capable of producing diffusion of heat throughout the economy, particularly observable at the periphery.

The reaction responses to heat and cold are always to induce peripheral vaso-motor dilatation, an increased flow of blood through the tissues, Nature's provision for equalizing the temperature of the tissues, by conduction and convection; the heated blood flowing on and giving place to blood at normal temperature; and in case the surface is chilled by cold, warmth is maintained by an increased influx of blood at normal temperature, unless the heat-producing powers are lowered. The reflexes from both heat and cold are to maintain the temperature equilibrium.

The significance of employing measures for the induction of hyperemia may be considered as two-fold. (1) They increase tissue metabolism and local cellular activity, thereby increasing local tissue nutrition with increase of local combustion and oxidation. (2) Coincidentally an increased influx of arterial blood into an infected part increases positive chemotaxis and phagocytosis.

Hyperemia, therefore, is of great therapeutic significance; and the different modalities have various indications for conserving the purpose of its induction under varying conditions.

Physical exercise plays an important role in the induction of body heat and hyperemia, together with increased tissue combustion, and as a prophylactic and corrective measure fills one of the most important roles in physical therapeutics.

It has been many times demonstrated that protoplasm stimulated by an electrical current is induced to contract with change of dimension, whereby a mass of cells thrown into contraction by such stimulus, induces the contraction of a gland or muscular structure. That this effect is not due to an action upon the central or peripheral nervous system, but upon protoplasm direct, has been demonstrated by its action upon muscular structures where the nerve supply had been severed.*

A current to so affect the protoplasm that comprises a mass of tissue in a manner that it will be induced to contract en masse,

*Howell's Textbook of Physiology, 1909, pp. 22 and 23.

requires a current which is of high potential, and capable of wide diffusion throughout tissues of variable resistance; not possible to be affected to the same extent by the constant or induced current. A stimulus to produce muscular contraction by the latter currents must be applied directly to the motor points, which, when so irritated, produce mass contraction to the corresponding muscle; a very different effect from the protoplasmic fibrillary contraction produced by the high potential static currents when applied to a tissue mass. It is to this protoplasmic contraction that the effects of an electrical current are due, in inducing tissue drainage by the expulsion from the tissue of exudation and infiltration as effected by these currents, and not so effectively by other currents.

A current administered for the purpose of effecting the drainage of an infiltrated tissue may be administered in one of two ways. With a rate of interruption above 600 per minute when a tonic contraction or tissue spasm is induced, to expel an infiltrate or exudation. Under such conditions expression takes place by unremitting pressure, which is not only extremely painful, but not so effective as a current administered in such a manner that the contractions are alternately followed by release, which method is more effective and less painful. The rate of interruption best calculated to effectively relieve such conditions is with a current interruption approximating 120 to 300 per minute. Slower contractions than 120 are slightly more painful and no more efficient; whereas, the greater the rate of interruption, the shorter the period of rest which should be approximately equal to the period of contraction. There is no measure which effects tissue drainage or elimination of an indurated area so effectively, and with so little disagreeable after effects, as the static modalities. The reason for this is explained, (1) by the diffusion of this current; (2) by the positive and painless character of the contraction by the wave current when applied under normal conditions, but painful and diagnostic where the contraction is of an indurated or contracted tissue; whereas, under regulation by gradually lengthening the spark gap as it can be tolerated, it will gradually produce deeper contraction of the infiltrated structures, thereby making it possible to graduate the dosage and effect to existing conditions. Let it be stated as a precaution, that no greater error can be made

than to employ such a method to an infected induration, thereby scattering the process.

The other static modalities, including the static sparks, the static brush discharge and the static induced current also produce tissue drainage of infiltrated areas by the induction of tissue contraction. The static spark affecting the deeper regions, while the static brush discharge is only applicable to tissues in which the involvement is superficial, whereas the regulated and well-directed static sparks will reach to affect the deep recess of the larger joints. A similar action over very small areas may be effected by the high tension faradic coil with a slow interruption and by coarse mass contraction with the sinusoidal current. The interruption of the larger Ruhmkorff coil as designed for exciting the Crooks tube are so rapid that they exceed 10,000 per second, so that no contraction whatever is induced.

Currents, likewise, which produce succeeding intense diffused contractions, followed by period of rest, have a remarkable facility for *relaxing muscular spasm*. The static wave current and the static sparks are preëminently the modalities of election for the production of this effect.

3. *For effects upon general metabolism*, the influence of an agent, or effects produced by it, must be demonstrated to be generally diffused throughout the economy, thereby awakening to activity the cells of the body generally. This effect may be produced mechanically by the surging passage throughout the tissues of electrons from a high potential unipolar source, as with the static wave current and the d'Arsonval current of high periodicity from a high potential source. The d'Arsonval current as administered by auto-condensation is practically unidirectional and unipolar as demonstrated in the report of the Committee on Standardization¹ and later by Dr. Edward C. Titus² and easily demonstrated by a method published in an editorial³ by employing the vacuum electrode

¹Report of Committees of the American Electro-Therapeutic Association. Jenks and Clark. Pages 90 to 95.

²Presidential Address. "Standardization of High Potential Electrical Currents." *Journal of Advanced Therapeutics* for December, 1909, page 598.

³"Currents of High Potential and High Periodicity and Their Relative Effects and Indication." *The Journal of Advanced Therapeutics*, January, 1910, page 35.

showing the predominance and unidirectional effects by the X-ray produced alternately with a change of polarity at opposite ends of the tube.

There are still some who deny the passage of the electrons throughout the body when the static current is administered. Your Committee on Static Electricity affirmed such passage at the session of 1908, in full accord with the statements of the scientific gentlemen who gave us the valued report on the physical action of electrical currents in 1903,⁴ in which the following statement was made, that "the small continuous current will pass *through* the patient without causing appreciable sensation" (the italics are ours). Now that it is generally conceded that electricity is matter, and that electrons are the smallest divisible particles of matter, their mechanical action when surging through the tissues cannot be questioned. By this means, and by probable effects of polarization, the general metabolism or tissue activity, both from the static wave current and unidirectional currents of high periodicity administered by d'Arsonvalization are self-evident. Furthermore, the laboratory findings, when these currents are employed, demonstrate an increased general metabolism, by the increased elimination of nitrogenous waste from the tissues.

Another modality, which affects very largely general metabolism, is the application of *intense radiant light and heat* which undoubtedly penetrates the tissues three to six inches, *i.e.*, the luminous and heat rays, inducing throughout the tissues exposed the effects of general hyperemia, and to that extent influencing general metabolism. Heat generated in this manner also stimulates the deep spinal centers, and produces general oxidation, by the heat conveyed by the blood, throughout the economy, and induces profuse perspiration with the elimination of toxic and other waste materials, coincidentally by the latent heat of evaporation, maintaining an equilibrium of temperature throughout the body.

Convective dry heat, applied by the body bath, likewise induces stimulating effects upon the deep spinal centers with the increase of heart force and volume of pulse, deepened respiration and a general superficial hyperemia, effecting thorough elimination by perspiration, throwing off toxic and waste materials. Through these channels, and at the same time by

⁴Page 53 of Reports of Committees.

evaporation with latent heat absorption a temperature equilibrium is maintained, as far as possible. With such body applications, which are continued at high temperature for a considerable time, however, the body temperature increases in spite of the evaporation of perspiration. By both the radiant light and heat and hot air bath, the evidences of increased metabolism are likewise found in the increased aggregate elimination of total solids with the urine.

The application of cold packs, when the patient's vitality is such that a reaction follows, likewise stimulates metabolic activity, particularly in the skin, where the blood passes in increasing volume through the dilated vessels to preserve a normal temperature at the surface. Here, as in the application of heat, the effects are much the same upon the deep centers, stimulating the heart to a greater force, and with increased heart activity, and a deepened respiration; but in no sense are the activities of the body increased except by arousing the heat-producing structures of the body, with which, by drawing upon the nutrition, body temperature is maintained by oxidation and tissue combustion.

The relative effects of cold as influencing metabolism is applicable to the treatment of fairly vigorous individuals, and contraindicated when a patient is so depressed that a reaction will not be instituted; whereas the application of heat produces a vigorous restitution, when the vital powers are low.

Reduction of high arterial tension for the purpose of relieving arterial hypertension is effected in various ways. The action of the high potential current administered by the d'Arsonval method possesses peculiar advantages in the treatment of hypertension, and is indicated when hypertension is not compensatory. The certainty with which blood pressure can be lowered progressively by positive d'Arsonval auto-condensation in a large percentage of patients to normal, and, except in advanced cases of arteriosclerosis, maintained there by diet and exercise, is remarkable. The action is probably due to the thermic effects of the current, with the possibly added electrical action upon the musculature, which Reus has designated as *myasthenia*. It is difficult to prove what is the exact *modus operandi* of the high potential currents, as affecting hypertension, but, as previously stated, the ever present thermic effect seems to be most reasonable.

Auto-condensation, employing a large solenoid placed to surround the patient, another method of d'Arsonval's, is efficient, though not so convenient, and possessing no advantages known to your committee over the method employed with the auto-condensation couch.

The employment of a *static method*, first described by Dr. Francis B. Bishop, of placing a half cage over the patient, lying upon the insulated platform, grounding the cage and the negative side of the static machine, with a spark one to one and one-half inches discharging between the knobs, with the machine running rapidly, is another efficient means of lowering blood tension, but possessing, not generally, any special advantages over the more convenient d'Arsonval method. It does seem, however, that in some cases blood pressure is lowered more rapidly by this method, though not as a rule.

Radiant light and heat applied with the light bath or general application over the whole body to the extent of producing general hyperemia lowers arterial tension by the influence of two effects produced: (1) by lessening of the fluids of the body, and (2) by dilating the superficial blood vessels.

Dry heat, employed in the body hot-air bath, produces a similar effect to radiant light and heat, though not so profound. The effects of light and dry hot-air baths are very temporary compared with the effects of d'Arsonvalization.

Any method which will produce a general hyperemia of the skin will lower blood pressure. The method employed by Schott, with Nauheim baths, possesses no advantage over the electrical methods, and from the records published by its votaries, does not seem to compare in its general efficiency with the method by d'Arsonvalization. The lowering of blood pressure by these methods has no depressing effect upon the heart, but relieves it of labor relative to the degree to which tension is lowered.

In atonic conditions, the application of stimulating measures to the surface of the body increases the reflex activity of all, or most, of the automatic centers, particularly of the cardiac, respiratory and heart centers. Of these measures, *radiant light and heat* probably possesses the general advantage, as responses are more prompt and persistent, owing to other effects which the same modality has upon circulation and general metabolism. Cold in the form of the cold pack and shower bath should be employed in cases only in which the resistance is fairly high. It is often very difficult to determine whether a patient would or would not react from the cold pack. On general principles, however, when radiant light and heat can be employed, no exception should be made as its employment is indicated even in conditions of extreme prostration.

(To be continued.)

ROENTGEN RAY TUBES.*

BY BURTON E. BAKER.

So many papers have been read and so much has been written of a purely scientific or speculative nature regarding Roentgen ray tubes that to deal with the subject in such a manner seems inopportune. That which concerns us most at present is a practical understanding of the methods employed for securing the maximum of work from tubes now at our disposal. It is my purpose to deal with the practical side of the subject rather than with the speculative. The early work of Lenard, Crook, Roentgen and others is so familiar to us all that to review it would uselessly consume your time. We will discuss our present day tubes and their construction and operation.

I exhibit here a tube of modern design. First let us consider its structure: The anode is supported so that if an imaginary line were drawn through its perpendicular axis, as it is now held, this line would pierce the cathode at its center and the center of the anode target, which, by the way, is supported at or about 45° to the horizontal plane of the cathode. The cathode face is concave and the radius of its curvature may be varied considerably without excessively distorting the focus. However, if the distance between the target or its focal point and the cathode were very greatly varied the curvature of the cathode face must be made to correspond. These two electrodes must, of course, be supported in vacuum space in order that any x-ray phenomena may occur, and when such a tube is exhausted of its air to a certain degree and the positive terminal of some source of high potential current is connected to the anode and the negative pole to the cathode, the current flows through the vacuum space from the anode to the cathode and the cathode stream passes from the cathode's concave surface and is focused so as to strike or bombard the face of the target at a small point opposite from which point x-rays are propagated.

This cathode stream must not be confused with the flow of current. Note that the current flows from the positive to the

*Read before the New England Society for Physical Therapeutics in Boston, October, 1910.

negative, but this cathode stream flows in a direction opposite to the current flow, and if the cathode did not face the target's center, the cathode stream would not be focused thereon. In other words, the *direction* of the cathode stream does not depend upon the current flow, for the cathode stream will bombard the material toward which it faces. The cathode stream, leaving the cathode, does so from the entire surface of its concavity being focussed to a small point at the target or anode, its whole energy is localized at the small point and considerable heat is generated there. In fact a great amount of heat is generated at this point when current of large dimension is used, and especially so if the vacuum is so high that the cathode stream is not retarded, or, in other words, if its velocity is high.

In any form of construction or in any method of pumping vacuum in an x-ray bulb, that which tends mostly to make a tube a success or failure is the cathode stream, since from its function only do we derive our x-rays. The speed of the cathode stream depends upon two factors, one of which is the voltage of the current applied and the other the degree of vacuum. If the vacuum be low, no matter what voltage is applied, the cathode stream will be relatively slow. The volume of the cathode stream will depend upon the amount of gas allowed to remain in the aluminum cathode itself and the volume of the current flow; if, however, a cathode were too highly exhausted, regardless of the vacuum of the bulb, the cathode stream cannot be of large volume even though current flowing is of large value.

The penetration of the x-rays generated at the target will depend upon several factors. If the cathode stream velocity is high and checked very suddenly the penetration will be high, but this high velocity depends upon the voltage applied and the vacuum of the bulb. It is true that even though the target surface does not abruptly stop the cathode stream and the vacuum is very high, the penetration will be high but there will be very low transformation of energy, that is, there will be a small amount of rays generated for the current input.

The material of which the face of the target is made is quite important. It must have high atomic weight in order that it may be opaque both to the cathode stream and the x-rays. The theory that metals of high atomic weight are more prefer-

able for the target seems to be well borne out. However, the material must have other properties besides high atomic weight. We find that if we are considering atomic weight only uranium would seem the ideal material to use; its atomic weight is 236.7 but its thermal capacity and heat conductivity are low.

Let us suppose, for instance, that this tube were equipped with a uranium face and that we were using a large amount of energy to excite it. For a very, very small fraction of a second the x-rays generated would be extremely brilliant and the volume very large but at the focus point a very high temperature would be generated; uranium has low heat conductivity and therefore the heat cannot be easily conducted away from the target's spot and absorbed by the heavy copper or other backing and it will be fused. Then we have punctured our uranium and instead of having a uranium target we would have copper or some other metal with which our target might be backed. It is true that copper has relatively high heat conductivity and thermal capacity but it has an atomic weight of only 63.1. The cathode stream or x-rays are allowed to pass more or less into its mass and the transformation of energy, that is, the cathode stream into x-rays, is very poor. Silver has an atomic weight of 107.1—higher than copper—but it has a low fusion point (960° Centigrade). It has high thermal capacity, but having neither high atomic weight or high fusion point it is poorly adapted to our purposes. Platinum so far seems to be the facing most generally used. Its atomic weight is 193.3; its fusion point, if pure, is about 1775° Centigrade; its heat conductivity is very much better than uranium and is in fact about one-third as good a heat conductor as copper. Iridium, which is especially noted for its extreme hardness, has an atomic weight of 191.5—slightly lower than that of platinum—and because of its extreme hardness and high atomic weight it is sometimes used, but its heat conductivity is considerably lower than platinum and that which is gained by a high fusion point (2200° Centigrade) is lost because of its low heat conductivity, or, in other words, because of its lack of power to transmit heat from the focal point into its own mass and to the heavy backing to which it is fastened.

For some years past and up to the present day, tubes have

been constructed which are known as "Water Cooled." A relatively thin mass of platinum, iridium, or alloy of both, has been sealed over the end of the glass tube and supported in the usual position and so arranged that cold water may be kept in actual contact with the back of the target. Some of these tubes have been arranged so that the water may circulate with a view of carrying away the heat as rapidly as generated, but in our present day practice, where currents of enormous volumes are used, the heat generated is so intense at the focal point that water boils locally and a steam bubble is formed directly back of the focal point and puncture occurs almost instantaneously, even though water may be in circulation. While it is true that water cooled tubes are in use to-day the percentage of all the operators using them is very small indeed.

The statement that the only way we have of disposing of heat generated at the focal point is by absorption may be challenged. It may be claimed that heat radiation plays an important factor in the successful operation of an x-ray tube energized by a heavy current, but so far I have failed to find a single tube which has shown that radiation does occur to any considerable extent. Heavy anodes, having platinum or iridium targets fastened to a large mass of copper, are usually supported to the glass bulbs by steel tubing or steel rod. Steel in itself has relatively poor heat conductivity and the only way this heat can escape from the anode to the surrounding atmosphere is by conduction through this steel tube or rod to the glass walls of the bulb, where they are in contact, and from thence to the outside atmosphere.

The length of time employed in modern exposures is usually a small number of seconds and in fact most of the modern exposures are only small fractions of a second's duration.

The penetration of the rays generated by this cathode stream, and in fact the amount of rays generated with a given amount of energy, varies somewhat with the nature of the residual gas in so-called vacuum. If a relatively large percentage of residual gas were oxygen, then for a given electrical resistance the penetration will be somewhat higher than with some of the other gases, but oxygen being very active quickly disappears. Hydrogen, so far, seems to be the best residual gas we can employ, it being relatively inactive and

permanent. Many experiments have been performed and are being performed daily along these lines, but we believe no very definite conclusions have been drawn as to just what is the best gas to employ.

The purity of the aluminum in the cathode is quite essential. Some makers have used aluminum castings, but all aluminum castings contain other metals alloyed with aluminum so as to facilitate its casting. Zinc, copper and other metals are frequently used as alloys; zinc especially is undesirable, first because it is apt to cause blackening of the bulb and such a deposit on the inside of the glass often materially resists passage of rays through it. It also has a tendency to foul the residual gases of the partial vacuum, seriously interfering with the normal functions of the tube.

Returning to the concavity of the cathode face let me say that the optical focus is not the electrical focus and the length of focus varies with the degree of vacuum.

In the pumping of an x-ray tube it is very essential that the anode should be thoroughly exhausted of its occluded gases in order that the tube shall not drop its vacuum materially when energized, and the anode is made hot due to the bombardment of the cathode stream. On the other hand, the cathode itself should not be over-exhausted because of the fact that if it is, it becomes very difficult for the cathode stream to form, even though a large amount of electrical energy be passed through it.

Regarding the glass bulbs: There is but little to be said except that the American glass manufacturers do not produce glass suitable for this purpose. The American glass is very opaque to x-rays and more or less unsuitable for the purpose otherwise. Our best bulbs are manufactured in Germany. Conscientious and particular manufacturers will take pains to see that the tubing and accessories of the bulb are made of the same glass as the bulb itself, or at least made of such glass as will have practically the same coefficient of expansion and will fuse together at practically the same temperature.

The manufacturer of x-ray tubes so frequently hears this complaint: "Just as soon as I attempt to put any amount of current through my tube the vacuum drops and the penetration becomes almost nil. What is the reason?" It may have occurred for two reasons; first, because the anode was

not properly evacuated and second because inverse current was allowed to pass through it. With all forms of magnetic generators or high potential currents there will be more or less inverse current, that is, at each impulse caused by the interrupter, at make and break, there will be current flowing in opposite directions in the secondary. We will take, for instance, a modern induction coil having either electrolytic or mechanical circuit breakers. When current is allowed to pass through the primary an impulse of current flows through the secondary in one direction, and when the current is broken through the primary, current in the secondary flows in an opposite direction. It is this current flowing at the time of break which has higher potential and it is the current which we desire to use. The current generated at make is useless to us, and it is that which causes so much trouble. It is true that its potential or voltage is relatively small, as compared to the total voltage or electro-motive force of the secondary at break, but if the vacuum of the tube is sufficiently low, so that this inverse voltage can get into the tube, it will become apparent, showing rings about the bulb and otherwise distorting the symmetrical appearance of a properly energized tube. If the tube has sufficiently high vacuum to resist the passage of the inverse currents this distortion does not appear. Any tube, no matter how perfectly made, will rapidly reduce in vacuum if an inverse current is allowed to pass through it, but experimenters have provided us with means of preventing this inverse current from passing through an x-ray tube. We have now what is known as a "valve tube," so constructed and evacuated that current passes through it very easily in one direction and only with difficulty in the opposite direction. Either one or more of these valves are so connected to an x-ray tube that a current passing in one direction does so freely; but a current attempting to pass in the other direction, being of relatively low voltage, that is, inverse, does not get past these valve tubes and does not show in our tube. It so happens that the degree of vacuum and penetration, so much desired in our modern technique for radiography of thick portions of heavy bodies, is such that an inverse current will freely pass through a tube, and this accounts for the general adoption of valve tubes for use in connection with modern radiography.

It is true that each individual operator has a different technique. One will expose his plates with a relatively high tube and develop the plates for contrast. Others will use a low tube and develop accordingly, but in summing up the technique of a large number of prominent operators it is found that a medium low vacuum technique is most commonly used and apparently the most satisfactory for the particular diagnostician.

With the apparatus at hand we will attempt to demonstrate inverse current and its elimination.

Roentgen tubes have not so far been made in which there could be any assurance that the anode target would not be punctured sooner or later due to heavy bombardment by the cathode stream. Various materials have been extensively experimented with for this purpose but the heat generated at the focal point is very intense with heavy current flow.

There are individual tubes which do not pit or fuse readily. The reason of this may be due to different factors: First, the cathode does not easily generate its stream and large energy is not necessarily localized; the other is that the stream may be poorly focused and heat generated over a larger area. Such tubes, however, have poor definition on the plate and where we might gain by not destroying our anode we would lose by poor ultimate results on our plates. Such a tube would undoubtedly be just as effective for treatment work where heavy currents were used for a considerable length of time.

It might be noted that the pitting is not always caused from high density of the cathode stream alone. Where impulse currents are used there is undoubtedly a heavy impact due to the sudden rush of energy which acts as a battering-ram, and if the tube has been in use for a few seconds, so that the anode is hot, the metal may actually be pushed aside from its focal point. It has been noted that when absolutely uninterrupted currents were used the pitting was of a different character; the metal was apparently fused and pushed aside with an even formation around the focal point and does not appear as if it were spattered.

Experiments have been made to determine how long current actually flows through a tube at each impulse of secondary current. The particular experiment to which I refer was made with a heavy induction coil with a rate of interruption of

7,200 times per minute. It was found that current actually flowed through the tube only one-fiftieth of the time; in other words, the space between each impulse was fifty times greater than the duration of each impulse and therefore the value of the current in each impulse must be fifty times greater than the average flow. If an uninterrupted current of equal power could be obtained, only one-fiftieth as much energy would have to be delivered constantly as with each impulse of an induction coil. This explains to us why currents derived from static machines, even of small volume, are so effective in radiographic work.

With a given x-ray tube, all conditions remaining the same, its radiographic speed is nearly inversely proportional to the square of the current; that is, if 10 milliamperes were flowing, the speed would be four times as great as if 5 milliamperes were flowing. The meter readings on different types of apparatus are confusing. For instance, it has been found by different experimenters that with a given meter, reading current on a modern induction coil, and with a given vacuum, 30 milliamperes has a speed equivalent to 55 milliamperes on transformer current. This difference in speed and reading is accounted for by the difference in wave forms of current.

Many attempts have been made to measure the energy of x-rays but so far these attempts have not been entirely successful. At present we are depending on measuring current flowing through the circuit and such means, in the hands of an experienced operator who is able to judge by the appearance of his tube as to its penetration, are to a certain extent successful. He, however, must know his tube's individuality, or, in other words, have a fair idea of its ratio of transformation. No two tubes are exactly alike in this respect, except by coincidence, and it is right here that lies the problem of the tube manufacturer. His constant aim and study must be to produce tubes uniformly of the same efficiency. It is true that tubes may be pumped of uniformly high vacuum, especially when this vacuum is pumped almost as high as it can be, and thereby secure a degree of uniformity, but unfortunately our advanced operators do not care to work with extremely high vacuum, and it is the moderately low vacuum and the large efficiency of transformation that are difficult to obtain and yet are so necessary to uniformly successful results.

FLORIDA AS A HEALTH RESORT. SOME COMMON QUESTIONS ANSWERED.

WILLIAM LEE SECOR, PH.D., M.D., ST. PETERSBURG, FLA.

Recently Head of the Department of Physiology and Professor of Therapeutics in the Chicago College of Medicine and Surgery.

Since I have been in Florida I have received so many letters from physicians in the North relative to sending patients here and in regard to Florida's climate from the therapeutic standpoint, that the subject seems of sufficient general interest to warrant the consideration of some of the most frequently asked questions in the pages of this journal.

Perhaps the greatest number of questions in one form or another are in regard to Florida's climate in general. This question alone would require many pages for its full consideration. We can only treat it briefly here.

It will be remembered that the climate of a given place depends upon a number of factors, as latitude, elevation, nature of soil, proximity to large bodies of water, forests or mountains, prevailing winds, etc. In considering the climate of Florida we have some factors that remain practically the same for all parts of the state and give a certain uniformity to the climate of the state as a whole, while other factors vary in different parts of the state and make some sections more desirable than others.

Much of the state of Florida is practically at sea level, the highest elevation in the state being 301 feet. The soil is sandy, pine forests are pretty well scattered over the whole state, and all parts are in more or less close proximity to ocean or gulf. These factors tend to give a uniformity to the climate of the whole state.

On the other hand, we find that Florida extends north and south over several degrees of latitude which would naturally affect the temperature. The temperature of the water of the Gulf of Mexico is several degrees higher than the temperature of the Atlantic Ocean at the same latitude, which would in some measure account for the difference in winter climate of the east and west coast of the state.

The official report of the Weather Bureau gives the mean January temperature of Jacksonville at 54°, Pensacola 52°,

Tampa 57°, and Key West 69°, while the mean July temperature for these cities is, respectively 81°, 81°, 80°, and 84°. The highest temperature ever officially recorded at Jacksonville was 104°, at Pensacola 103°, while at Tampa, several hundred miles further south, it was only 96°. This tends to show that various local elements have much to do in determining temperature and climate.

The east coast of the state is subject to more sudden changes than the west coast, because it is at the mercy of storms from over the Atlantic. The strong, cold winds that are at times disagreeable on the east coast are seldom noticed on the west coast.

The climate of inland Florida is very similar to that of the coasts.

The average velocity of the wind at Jacksonville is six miles per hour, while at Chicago and New York it is nine miles, and at Boston eleven miles.

The mean annual rainfall is high in Florida. Jacksonville 53.2 inches, Tampa 53.1 inches, etc., and it nearly all falls during June, July and August, so that during this time, spoken of as the rainy season, the humidity is high, while during the winter months the humidity is comparatively low for a sea coast section.

II. What classes of patients should physicians advise to spend their winters in Florida?

I believe that almost any aged or feeble person would be greatly benefited by wintering where they will be free from the disagreeable features of our northern winters and springs.

Convalescents find the warm, soothing breezes and perpetual sunshine very gratifying.

Sufferers from kidney conditions in which an increased skin activity and a mild equable climate are desirable are usually greatly benefited.

Chronic bronchitis of the dry type is usually relieved, but where there is a hypersecretion little or no benefit is derived.

The asthmatic frequently finds great relief. Some types, however, are not benefited.

Nervous diseases, as neurasthenia, hysteria and the milder mental diseases do well. Insomnia is usually relieved. Phys-

icians should caution nervous patients about too great exposure to the sun. The head should always be well protected.

Eczenia and some other skin diseases are often benefited.

Sufferers from chronic rheumatism, neuritis, neuralgia and similar conditions usually notice a marked improvement. Better results will be obtained if they live on the higher ground back a few blocks from the water, rather than right on the water front.

Delicate children, especially those subject to heavy colds or bronchitis during the northern winters and those who have not fully recovered from an attack of pneumonia or influenza.

Tuberculosis does better at inland points than right on the coast.

III. Does it make any particular difference as to what part of Florida the patient is sent?

It certainly does. If you have a patient for whom you desire change of climate and environment, whose mind would be diverted from himself or his troubles and he would be benefited by a gay, social whirl, send him down the east coast. On the other hand, if your patient requires more rest and quiet, pick out some of the inland towns or a place on the west coast.

IV. What facilities for transportation are offered?

Through Pullman service from Philadelphia, New York, Chicago, St. Louis, etc. Steamship service between Jacksonville and New York, Tampa and New York, Tampa and Mobile, and other points.

V. What sort of accommodations may be had and what is the expense?

Any sort you may desire, from the finest hotels, like the Ponce de Leon or Tampa Bay, to a two-room cottage.

The price of board and room ranges from \$10.00 a week in the smaller boarding houses to as much as you care to make it at the finest hotels. Good hotel accommodations can be had at from \$15.00 to \$20.00 per week. Cottages of from three to six rooms can be rented completely furnished for house-keeping.

VI. When should patients start south?

If there is nothing to prevent, I would say go early and stay late. If, however, only a certain amount of time can be spent in Florida, go late and stay until the home spring weather is

thoroughly settled. This is especially important to those who are aged or feeble.

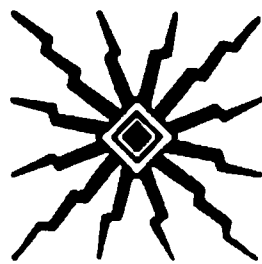
VII. What facilities for medical and surgical treatment are provided?

All of the cities have up-to-date physicians with well-equipped offices. In several provision is made for the employment of hydrotherapy, electrotherapy, vibrotherapy, and all of the other methods of physical therapy. Well equipped hospitals are seen in all the larger places.

VIII. How can a physician in the north arrange for his patients to be sure of proper accommodation upon their arrival at destination in Florida?

If you have a patient that you desire to refer to a physician here, write that physician, giving condition and circumstances of patient, and he will have proper accommodations waiting when patient arrives.

If you do not care to place your patient in the care of a local physician, write the Board of Trade of the town you select for a list of hotels and boarding houses in that town, then wire them to reserve accommodations. Select a place that is properly heated, for there are some cold days in Florida, and those not in the best of health should be where they can have heat if needed. Do not send tubercular patients to hotels or furnished rooms. Send them to institutions especially prepared for them.



Progress in Physical Therapeutics.

GYNECOLOGY AND ELECTRO-CHEMICAL SURGERY.

EDITED BY G. BETTON MASSEY, M.D.

Clinical Notes in Ionic Surgery. Epithelioma of the Mouth.*

I am able to show you to-day three patients who have been under major operations of zinc-mercury ionization for epithelioma of the mouth, thanks to our rule that they shall return for examination at regular intervals. Each of these cases has been reported elsewhere.†

This man (Case No. 652 in that report) is now 83 years old. Three years ago an epithelioma about the size of half a lemon, projecting from the buccal surface of the right cheek near the angle of the mouth, was destroyed in a major ionic operation, 200 to 300 milliamperes being used, monopolar, for 50 minutes, with properly insulated zinc-mercury needles. No sign of the growth remained some months later, and this condition continued until three months ago, when examination showed some nodules of apparent recurrence on the adjacent gum of the upper jaw. I immediately began minor zinc-mercury ionizations with a single fine needle of zinc, coated to one-eighth of an inch of the point with sealing wax, the fine conducting wire attached to it being guyed to the surface of the face with adhesive plaster in such a way that the instrument will keep its place during the applications. These were from 2 to 8 milliamperes in strength and of the regular duration of half an hour, repeated at first three times a week, but latterly only once a week. The negative pad is merely placed beneath the hands for these small applications.

You will notice that a bare remnant of these nodules now remains.

This case teaches us the necessity for watching these patients ourselves, and not entrusting this important post-operative duty to the patients alone. The gravity of the case is unquestionable, having been verified by microscopic examination; yet a recurrence at the end of three years is averted by very simple applications because of early discovery. The advanced age of the patient would render another etherization impracticable.

*From notes of informal clinical talks at the Oncologic Hospital, October, 1910.

†Vide, "Ionic Surgery in the Treatment of Cancer," Chapter X.

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The next patient, a man now 70 years old (No. 697 in report), has come for his quarterly examination. He received a major bipolar zinc-mercury ionization in March, 1908, for a recurrent epithelioma of the left angle of the mouth the size of a half dollar, extending through the cheek to the buccal mucous membrane and up on the upper lip, with an epitheliomatous horny excrescence projecting from the latter situation. The operation was bipolar, with 300 to 400 milliamperes for 13 minutes, followed by 300 monopolar additional 25 minutes. A large opening resulted in the cheek at this angle of the mouth, almost doubling the size of the mouth; but you will notice that the excellent, soft scar now seen has so contracted that the mouth is quite normal again. No evidence of the disease will be found, now some two and a half years after the application. The diagnosis was also verified by the microscope in this case.

Of the ten cases reported as showing no evidence of disease in the chapter of the work alluded to, two have since turned out ultimate failures. One of these was an old man, No. 460, in whom an exceedingly virulent recurrence took place four years after treatment. In the other case the patient became discouraged after the appearance of a small recurrence and abandoned treatment (No. 830). The remaining eight cases are known to be still free from the disease..

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M.D.

Radical X-ray Treatment. New York Medical Journal, Nov. 26, 1910.

Freund has tabulated the diseases that may be treated with the x-rays into four classes, according to their amenability to this method of treatment. The first class, which is the most amenable, is composed of diseases of the skin that affect the portions of the body covered with hair. The reasons why diseases of the skin in the hairy parts of the body should respond to the x-ray better than those in other parts he does not know, but says it is a clinical fact. In many of these cases a single treatment is enough to effect a cure, and in all a cure can be effected by repeated exposures. The second class is composed of a number of skin diseases, including lupus vulgaris, ulcus rodens, epithelioma, warts, trachoma, and tuberculous osteo-arthritis, in which a radical cure is to be obtained by repeated exposures. The third class is composed of other skin diseases, like prurigo, eczema, psoriasis, lichen, lupus

erythematosis and acne, in which treatment affords a temporary improvement, after which recurrences are liable to take place. The fourth class consists of the deep seated tumors, keloids, hypertrophies, and diseases in which the result of treatment is uncertain. In regard to the treatment of tumors he says that the greater the tumor masses are which are exposed to the x-rays, the greater their thickness and atomic weight, and the weaker the radiation used, the less is the outlook for radical improvement and the nearer is the danger approached that the advancement of the pathological process will be favored by the radiation.

Bier's Treatment by Venous Hyperemia.

MacEwan remarks that Bier has given us a fresh conception of the nature and purpose of inflammation, and has made important additions to our resources for subduing it. In closed tuberculosis, venous congestion is limited and uncertain in its effects and is sometimes productive of harm. In open tuberculosis it is comparatively safe and yields successful results, especially when the suction method is used.

I simply call attention to the foregoing statements in regard to hyperemia by Bier's method, and would thereby call attention to the hyperemias that can be produced with so much more telling effect by other modalities, especially radiant light and heat and high frequency currents.

J. D. G.

The Use of Radium Emanations in Internal Medicine (New York Medical Journal, October 16th, 1910).

Waschmann presents a very valuable paper on this subject. He calls special attention to the radioactivity of the waters of Gastein Springs in the Tyrol. The Doctor calls attention to the results of the waters of this noted spring, especially on the digestion and other organs of the body. Also to the short time the water holds its activity and usefulness.

Dr. Morton was the first to experiment and publish his results along this line, which at one time seemed to be opening up a new field of usefulness. Dr. Morton has been much pleased with some of his results, and it is to be hoped that he will contribute more on this interesting subject.

J. D. G.

X-ray Treatment of Tuberculous Adenitis. Edward C. Titus, M.D., of New York (*Journal of Surgery*).

In this paper Dr. Titus points out the modes of infection of the gland and also how the ray acts in inhibiting the gland

processes. He advises that the suppurating glands be opened and that this be followed by the x-ray as if it had never been opened and results will be good. He calls attention to the experiments he made several years ago on eggs, wheat and other grains, in which the x-rays by inhibition destroyed the life of the eggs and grains exposed. He considers that the great advantage of the x-ray over the knife is first its cosmetic effects, and also that while the surgeon cannot help overlooking some of the points of infection, the x-ray will search them all out with greater precision. He treats the patients every other day until he gets up a dermatitis, when treatment is discontinued until it disappears, and resumed or not as indicated.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

The Combined Quinine and Hydropathic Treatment of Whooping Cough. By Theodore Zangger (*British Medical Journal*, Oct. 15, 1910).

We are glad again to note the favor and esteem in which the writer holds Hydrotherapy in the treatment of this disease. While we dislike the term "Hydropathic" and believe that Hydrotherapeutic is a better one, still there is no question but what the treatment remains just as effective under either title.

To combat the infective factor in whooping cough the author uses quinine in the form of a one to two per cent. solution of hydrochloride in doses of two and one-half fluid drachms administered at 8 a.m., and 2 p.m. and 6 p.m.; in severe cases also at 11 a.m. The one per cent. solution can easily be administered diluted with milk or water to children under one year of age. For older cases he also prefers this preparation of quinine, but the objection of the patients and relatives to its bitter taste is great. He has therefore substituted a preparation called euquinine, which can be administered in powders of two to four grains three or four times a day, according to the age of the child. Euquinine has the advantage over quinine hydrochloride in being almost non-irritative for the mucous membrane of the stomach, which is of great importance.

To influence the neurotic element of the disease, which is most distressing and wearisome in the convulsive stage, the author has given up narcotics and bromides in favor of simple hydropathic "packs," which he says have a most sedative influ-

ence on the nervous system. Their application may be shortly described as follows: Spread a child's blanket crossways over a bed, lay on it a sheet, once doubled, and soaked in tepid water of 54 (or even 52) to 60° F., and well wrung out. Lay the patient on this sheet and wrap him in it; the wet pack must reach from the armpits to the knees, and be well covered by the blanket. The latter is fastened with safety pins, but not so tightly that the patient cannot sit up when a convulsive attack comes on. These packs Dr. Zangger has applied at 6 p.m. or 7 p.m., and renewed at about 10 p.m. and left till the morning.

In cases where the cough was especially distressing, later on in the night, he has had them applied at 9 or 10 p.m., and removed two to three hours later, when the first convulsive whoops again supervene. The attendants are invariably most happy to make these applications, as they ensure a better night, not only for the patients but also for themselves.

STATIC ELECTRICITY.

EDITED BY J. H. BURCH, M.D.

Neuritis. By William Benham Snow, M.D., New York (*Medical Record*, October 1st, 1910).

In a valuable communication read before the Third International Congress of Physiotherapy at Paris, France, April 1, 1910, Dr. William Benham Snow reviews the etiology, pathology and treatment of neuritis.

In discussing the pathology of neuritis Dr. Snow calls especial attention to pressure upon certain exposed areas of nerve trunks. He calls particular attention to the importance of points where the nerve crosses bony prominence or fibrous structures, or where a muscle is located over a nerve track in an exposed part of the body. Among these areas Dr. Snow mentions pressure upon the sciatic nerve at the sacrosciatic notch as the nerve passes beneath the pyraformis muscle. The crural nerve as it passes beneath Pupart's ligament; the lumbosacral cord and the anterior crural that cross the sacroillac synchondrosis; the musculo-spiral and circumflex that emerges from beneath the teres minor; the superscapular that passes out beneath the trapezius and enters the supraspinatus fossa of the scapula; the inferior dental where it enters the canal in the inferior maxillary bone; the superior maxillary at its exit from

the infraorbital foramen. Dr. Snow maintains that these exposed points explain a large percentage of the cases of neuritis that we are called upon to treat.

In the treatment of neuritis Dr. Snow advises the employment of the static wave current, static sparks and the static brush discharge. He also recommends radiant light that in every instance should be employed before the application of the static wave current and mechanical vibration only for the purpose of overcoming muscular and tissue tension.

Dr. Snow employs the following technique: If there is great pain and tenderness of the parts, as in acute cases, the affected area is first irradiated by means of a high power incandescent lamp to the extent of inducing an intense hyperemia. This should always precede the application of the wave-current. The patient is then seated upon an insulated platform, a metal electrode of lead, block tin, or bottle cap composition (22 guage is the best thickness) is carefully adapted to the part to be treated and securely adjusted over the affected area. This metal electrode is attached to the positive side of the static machine, the opposite side of the apparatus being grounded. The discharging rods are gradually separated to the point of tolerance. It is Dr. Snow's custom to follow the application of the wave-current by a few static sparks over the affected area. During the application of the static sparks he advises that the affected member be moved about in the position that causes the greatest pain, thereby indicating where pain is induced by the movement, directing the sparks to this area.

In the treatment of ticdouloureux the application of the wave current is best followed by the static brush discharge instead of sparks. When the lesion is in the mouth a vacuum tube electrode is held over the affected area.

In the treatment of herpes zoster Dr. Snow advises the use of the static brush discharge over the herpetic area, having first irradiated the part by means of a high power incandescent lamp. Over the unerupted area he advises the application of the wave-current.

In the treatment of intrapelvic neuritis caused by sacroiliac subluxation the writer advises the application of the static wave current. An electrode $3\frac{1}{2} \times 8$ inches is applied over the sacro-illac synchondrosis and contracted muscles of the gluteal region. The spark gap is to be gradually increased, keeping it at a point of tolerance, that is usually from three to ten inches. This is to be followed by long static sparks. In some protracted cases, however, he advises the reduction of the subluxation by means of forcible flexion and rotation of the thigh upon the trunk.

PHOTOTHERAPY AND DERMATOLOGY.

EDITED BY HERBERT F. PITCHER, M.D.

Treatment of Acne with Special Reference to Bier's Hyperemia. By Eberhard W. Dittrich, M.D., from the *New York Post-Graduate Journal*.

The author, in speaking of the constitutional causes of acne, mentions among the chief causes gastrointestinal disturbances, menstrual and uterine disorders and certain forms of blood dyscrasia, such as chlorosis, etc., and external causes as being the lack of cleanliness, exposure to dust and filth and improper attention and care of the integument. After regulating the bowels and diet, he prefers a vegetable diet, and prohibits the use of coffee, tea, alcohol, nuts, fatty substances, etc. For anemia he gives iron and sometimes arsenic. Of the external remedies sulphur occupies the first rank. But in most cases he is obliged to resort to radical mechanical means. He says comedones must be extracted and all papules and pustules opened with a sharp little knife like an iridectomy knife, and the whole face curetted with a small dermal curette. In certain cases he peels the entire skin from the affected area by the use of naphetrol, sulphur, green soap and petroleum paste as advised by Lassar. As a most valuable adjuvant to the treatment the author has used dry cups as advised by Klapp and Bier.

All shapes and sizes of cups can be used to fit any uneven part of the face or body. The pustules discharge at first a puro-sanguinous fluid which soon changes to healing serum, which should be left on to dry. The papules in a day or two clear up of themselves. The applications are made daily until the pustular lesions cease to appear. The results are evidently due to removal of the gases from the tissues, to dilatation of the capillaries and a greater influx of the fluid parts of the blood serum. The author, in speaking of the opsonic method, thinks that although the theory is quite convincing, very few physicians have a laboratory and the time to follow out the lines of treatment.

He thought his paper would not be complete without mentioning electrotherapy. He spoke of all glandular tissue as being affected by the x-ray. The first effect being to stimulate glandular activity, the next to inhibit glandular action. This being the effect desired, when the x-ray is used in the treatment of acne, which must be looked upon as a glandular activity, from some cause external or internal. When just the proper dose is used the results are very satisfactory. He thinks it should not be recommended as a routine procedure, but should be left to the x-ray specialist. The author is studying the effects of the Cornell tube on skin lesions, as the tube is

applied close to the skin there has been no untoward effects even after exposing some patients for 30 minutes at one session.

He thinks the high frequency current, applied with a vacuum tube electrode, acts as any other counter-irritant or rubefacient would as a local stimulant. For one or two hours there is an increase in the local circulation and blood supply. All effects are due to this local increase in metabolic change.

RADIOGRAPHY.

EDITED BY FREDERICK M. LAW, M.D.

X-Ray Ink. Interstate Medical Journal. By Dr. E. W. Skinner, Kansas City.

In this article Dr. Skinner describes a fluid which he calls x-ray ink. It is a suspension in water of a substance opaque to the x-ray. After shaking thoroughly it can be used as ordinary ink, preferably with a stub pen and cork-tipped penholder. Any description or identification of the plate can be written on the yellow envelope or on a piece of paper and placed on the envelope before the exposure. The writing shows as transparent spots on the plate. Dr. Skinner does not give the formula of the ink, but states that it can be obtained from Roentgen manufacturers at reasonable cost.

Rapid Stereo-Roentgenography of the Thorax and Abdomen.

By Charles Lester Leonard, M.D., Philadelphia, Pa. *Archives of the Roentgen Ray.*

Dr. Leonard advises the employment of rapid exposures, thus obtaining more detail in the soft structures without fixation of the patient, and eliminating even the motion caused by involuntary stimuli. He describes in detail the advantages of the stereoscopic view over the single negative, by the introduction of perspective in the picture. The exact location and relation of the areas of different density can be readily determined. Consolidations in the lungs received a placity, which gives them form and mass, and cavities have a definite form with concave and convex walls of variable thickness. The peri-bronchial lymph glands stand out alone, often appearing as a cluster of grapes. The picture of the stomach after the bismuth meal, instead of appearing as a flat shadow, has a definite shape, and its position relative to the neighboring bony structures can be accurately determined. In the small intestines the small peristaltic waves are shown in detail and the entire course of the shadows can be traced out. Stereoscopic-Roentgenography is one of the fine arts of x-ray work, and Dr. Leonard had brought it out beautifully in his article.

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DR. FRED'K M. LAW	New York	DR. HERBERT F. PITCHER	Haverhill
DR. FRANCIS H. MUNROE	Newark	DR. AMÉDÉE GRANGER	New Orleans
DR. CURRAN POPE	Louisville	DR. F. HOWARD HUMPHRIS	London, Eng.

DEVELOPMENT IN MEDICAL SCIENCE.

THE science of medicine from earliest times has been shrouded in mysteries to be revealed. Each discovery of the physical and physiological workings of the human organism has given a new impetus in one or another direction, tending to place the science upon a more substantial basis, leading progressively to a more rational understanding of the indications for the relief of departures from normal of the functions or conditions of the body. One by one the empirical vagaries vanish, giving place to more stable and rational methods.

From ancient times, until comparatively recent dates, the profession has relied very largely upon chemical substances, organic and inorganic for altering or correcting unnatural processes as manifested by fever, pain, or the effects of functional impairment.

Surgery has progressively developed an inclination to remove every offending organ which would not result in immediate destruction of life, often without realization of the importance of the function to be disturbed. Resulting conditions have often demonstrated that such removals are fraught to a great degree with serious consequences; until gradually checks have been put upon dismemberment except under conditions of extremity as the necessary removal of malignant growths or actual obstruction, or other conditions which would otherwise promptly terminate life.

With the increasing knowledge of the functions and rela-

tions of the parts of the organism to each other, and to the causes which are conducive to functional derangements, the importance of the preservation of the functions by prophylaxis, when possible, and by the employment of other means which restore function, usually by relieving inflammation, has awakened the interest of the profession. The era of exclusive drug medication has passed, and the extremes of surgical intervention are waning. A new era in medicine is dawning.

At the present time the laboratories furnished with abundant resources are investigating with skill and energy the scientific relation of various antibodies and antagonistic germs or their toxins in the treatment of infectious diseases or conditions. This began first with the empiric employment of vaccination, which long antedated any recognition of the process of immunization as now demonstrated. Later the introduction of the diphtheria antitoxin gave a new impetus to this department of medicine. The discovery by Metchnikoff of the process of phagocytosis, and the researches by numerous other observers which followed, led on by the expositions of Wright and the study of opsonins, gave a great impetus to that department of medical research. Already, however, the enthusiasm has been dampened. The increase of the opsonic index by the introduction of dessicated germs into the tissues has not realized the hopes of its advocates; and of late objections have arisen to its general adoption; for failures have been the rule; either from unskilled technique, or inadequacy of the method and theory.

It must be conceded, however, that a large measure of success has been obtained in the treatment by antitoxines of diphtheria, tetanus, cerebro-spinal meningitis, and pyogenic infections. The employment of the various anti-tuberculosis serums, the first introduction of which was received with enthusiasm by Koch and his followers, has not realized the hopes of its advocates. In asthenic conditions, arising from violent infection in which the resistance of the organism may be high at the outset, the employment of antibodies, however, has been eminently successful. In affections in which the resistance is uniformly low, as in tuberculosis, the indication is first of all to raise the resistance by other means than by the injection of antibodies which are too apt to still farther lower it.

Organotherapy, or the employment of glandular extracts as substitutes for deficient organic secretion due to inadequate functionation, has been remarkably successful and will always be recognized of therapeutic significance in the treatment of the class of cases in which they are indicated.

Ehrlich's new discovery, the result of investigation with organic compounds in which he sought to evolve a drug which taken internally should act as a parasiticide, and destroy the germs of syphilis without dangerously affecting the tissue cells, has resulted in a measure of success in the discovery in the compound known as "606." The combination sought by Ehrlich was one which should be to a large degree "parasitotrophic," and to a very moderate degree "organotrophic." In other words, that a single dose might destroy the microorganisms without seriously affecting the life of the patient. The compound designated as "606" is an arsenical preparation, which requires great care in its preparation for administration and is not unmingled with danger to the life of the organism when improperly administered. This new remedy, which seeks to destroy the spirocheta of syphilis, is now on trial, and receiving the greatest attention of the medical world. Its success or failure under such rigorous espionage, must soon be determined. If successful, it will be one of the greatest triumphs of chemical medicine, though limited in its scope.

One by one as these methods, which are engaging the professional mind, are determined to be valuable or otherwise, the drift of research will take new channels.

In the meantime, those who are giving their attention to the development of rational physical therapeutics, looking to a mechanical induction of physical activities in parts of the organisms where function is impaired are certain shortly to receive general professional recognition.

The time is not distant when it will be generally accepted by the profession at large that the employment of external agencies as radiant light and heat and the static and high frequency currents will restore body resistance by bringing to normal the proportions of the constituents of the blood; by restoring circulation and function to dormant infiltrated organs; and by relieving the labors of the heart by removing arterial tension. Added to these the realization that such agents likewise limit or destroy germ life, either directly or through the institu-

tion of greater activity with the restoration of the normal functions and constitution of the organism; and that inflammatory processes are arrested and abated by these and other physical measures; and that by the regulation of diet and exercise to the individual conditions of life are rendered safe, and there can be no opposition to universal recognition.

With the establishment and dissemination of the correct knowledge of the indications and methods of employment, in the proper fields of the respective therapeutic measures, the practice of medicine will take on new life, and the satisfaction and enthusiasm of those who know them now will be widespread.

Never in the history of medicine was there so great need for the introduction of physical measures as now, when the public drift is to the cults who accomplish some things better than the rank and file of the profession now do.

EARLY DIAGNOSIS AND TREATMENT OF UTERINE FIBROIDS.

NEURITIS, or pain along branches of the sciatica and crural nerves, and discomfort in locomotion, so often present in women after thirty years of age, are apt to be associated with uterine congestions or fibroid tumors with posterior displacements, due to pressure upon the sacral nerves. A thorough examination into these cases will often discover an early fibroid, which may not be at first discovered, except by failure to relieve the condition by a thorough treatment directed to relief of uterine congestion. The employment of measures such as the static wave current which will effectually relieve such congestion if present, will exclude a possible subinvolution, or congestion associated with endometritis, in cases in which the tumor cannot be made out by palpation.

That these cases should not be treated by removal in women between the ages of thirty and forty-five, is generally conceded by conservative gynecologists, on account of the nervous phenomena which so often follow hysterectomy.

Recent investigations by radio-therapeutists have clearly shown that most of these cases may be effectually relieved and the tumor reduced generally to normal with but little

likelihood of subsequent increase in size. The use of the Roentgen ray in these cases employing it either from above the pubis or from below the coccyx at alternate exposures or, in order to expedite the effect, raying on the same day over the pubis and below the coccyx, in either event carrying out the procedure until a first degree dermatitis appears. This may be repeated for several series of exposures, until an early menopause is established, when the treatments may be discontinued, and there will be no likelihood of a recurrence.

If the operator will bear in mind that radiant light either from an incandescent or arc light, applied to the extent of inducing a marked hyperemia of the skin daily after a dermatitis appears, will arrest any untoward effects of the Roentgen rays, he will be relieved of unnecessary anxiety.

Another observation which argues strongly in favor of the use of the x-ray is that profuse hemorrhages are promptly arrested in all except the subserous type of fibroid, in which this method of treatment is not so successful.

It should also be observed that patients treated in this manner very rarely suffer from any nervous manifestations due to the arrested menstruation, or the usual symptoms of the menopause. The gradual arrestment of the pelvic activities, with the diminished blood supply to the parts due also to the effects of the Roentgen ray, undoubtedly accounts for the non-appearance of the common nervous phenomena.

This method may often be employed successfully when an intermural fibroid has developed to considerable size, though in those of very large size, the results are far less satisfactory.

If the x-ray is employed judiciously in the treatment of uterine fibroids, except, as previously stated, in the cases of subserous pedunculated fibroids, the method is certain to supplant surgery. To the present time no contraindication has developed under judicious management; and, though the process is far more tedious than the rapid surgical method, the ultimate results are so much more satisfactory, that this objection is unimportant. It only remains for those who are directing these patients to recognize the importance of the general adoption of the method.

OSTEO-ARTHRITIS OF THE SPINE.***BY FRANK E. PECKHAM, M.D., PROVIDENCE, R. I.**

Osteo-arthritis of the spine is simply the hypertrophic type of chronic joint disease and represents one of the phases of what has been called rheumatism. The symptoms of this affection differ with the severity of the disease, and whether it is an acute attack or, as is most usual, the slow progressing affair. In the usual type which is extremely slow in its onset, there may be acute exacerbations, the recovery from which may be also more or less delayed depending on the resistance of the patient and the amount of poison absorbed. It is a pretty well settled fact with the most advanced workers in this field that it is a question of auto-infection or auto-intoxication. The types of spinal infection following infectious diseases such as typhoid fever, gonorrhœa, local foci of infection such as the tonsils, the mastoid, alveolar abscess, etc., not being under discussion it follows that the local toxæmia (or, rather rare, local infection) is due to a faulty physiology somewhere in the economy. The intestinal canal is perhaps the most frequent source of such disturbances, the liver is also an extremely important organ as well as the spleen. When it comes to physiology and real facts are looked for it becomes at once apparent that there is very little really known.

The symptoms of this condition are variable as suggested above. The local infiltration of toxic material means stiffness and this is manifested by limitation in motion. This limitation in motion usually exists before the patient is at all aware of it, because it is of such slow onset. After the slight beginning of infiltration the patient may be exposed to a draft or to the inclemency of the weather or to an unusual amount of work (strain), thus bringing on perhaps for the first time a slight amount of active congestion. Under these conditions the stiffness becomes apparent to the patient, the usual movements of the spine causing pain. An attack of this sort may be very acute and very severe, with fever, necessitating time in bed, or it may be very slight, not enough to keep the patient

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from work or occupation. The mild attacks would subside after a short time with what would seem like complete recovery. If an examination could be made, however, it might be found that there was some slight limitation to lateral bending, showing that there was some permanent damage done and successive attacks of a mild nature continue to more and more cripple the spine until medical advice was sought.. Usually, however, this condition of the spine begins in a very insidious manner and progresses very slowly so that when advice is finally sought much more advance has been made than the patient has any idea of. In these early stages, as already stated, the process consists of an infiltration of the soft structures with a toxic material, which by its irritation produces a thickened and more or less hypertrophic condition of the soft structures. As times goes on and the later stages are reached bone salts are deposited and there results an encrustation of the surfaces of the vertebre, beginning probably at the joint edges and in aggravated cases completely covering their bodies. Beginning even with the first infiltration it is evident that there must be limitation in motion (lateral bendings), and muscular irritability on the affected side or sides, just in proportion as this infiltration and thickening interferes with the elasticity of the structure. This elasticity being interfered with, means that these inelastic, unstretchable tissues (ligaments and muscles) stand out more prominently than their mates of the unaffected side when tension is made upon them in the effort of voluntary lateral bending, while in the later stages of encrustation motions of the spine become interfered with mechanically.

It is quite logical therefore that in the mild cases the patient seeks advice because he cannot get along as well as formerly, or if it has been slowly increasing in severity, work or occupation has to be given up either on account of inability to move the spine sufficiently in bending movements or on account of pain, or both. The pain is more apt to be referred to the terminal nerve areas, although it may be at the seat of the trouble also. When the movements of bending bring the thickened or encrusted areas in closer contact there is pressure produced locally, which causes pain directly in the area involved, but when the early infiltration simply presses on the nerve trunks sufficiently to cause irritation, pain results at the terminals. Under these conditions the pain may be around

the sides of the chest and may have been diagnosed Inter-costal Neuralgia. It may be in the gastric area and may have been diagnosed gastritis. Indeed, gastritis may actually exist due entirely to this nerve irritation. Pain may exist at the terminals around the knees and ankles and be mistaken for joint trouble. When the cervical spine is involved the pain is very apt to be at the seat of the trouble, but in addition the nerves which supply the face and head may be irritated along their trunks in such a manner as to give rise to severe and continuous neuralgia and it is not uncommon to see such cases treated locally when the whole trouble is with the cervical spine.

When such a patient consults us, a thorough physical examination should be made in an attempt to find the focus of the trouble and the cause. The cause will always be found by following the lines just laid down. In fact, in any painful affection it is more and more impressed upon us that pain is a symptom, a crying out of the nerves, pointing out the way just as clearly as it can be done and more and more should we study these signs and be better and better able to properly interpret them. With such a patient standing with the back exposed it will be evident that on lateral bending the excursion will be more limited on one side or, if both sides are affected, both excursions will be limited. Forward bending is not so apt to be interfered with in the early stages and not until encrustation takes place. Backward bending may be free in the early stages, but a little later becomes involved and in the encrustation stage is more and more limited and in the aggravated types, the spine may be completely rigid from top to bottom.

Considering the fact that auto-intoxication is the cause of most of this trouble let us consider for a little the reasons or causes of this, auto-intoxication, because treatment, if it is to produce anything like a permanent cure must deal with these problems and if the cause can be really removed in any given case, that case will be really cured. The very first step in discussion is the preparation of the food in the mouth in order that it may be in proper condition to be acted on by the gastric juices. In the mouth the food is broken up into small particles by mastication. This means that the teeth should be in such a condition that they will perform this act properly. In people who have lost teeth the careful adjustment of artificial

teeth is a necessity. Simultaneously with proper mastication the saliva is stimulated to flow and thus the food should become thoroughly mixed with this all important alkaline fluid. In a great many people, if not most people, this preliminary (mouth) preparation of food is gone through hurriedly and no attention paid to it. Mr. Fletcher must be credited with calling attention to this matter anew. I think it will be found that the great majority of people put too large morsels of food in the mouth in the first place, then it is chewed some (not much) and immediately washed down by drinking some water, or coffee, or tea or whatever the favorite beverage may be. In this way the fluid takes the place of the saliva, which means that practically no demand has been made upon the salivary glands to do their work and in consequence proportionately very little saliva is secreted. The food goes into the stomach in too large morsels and not mixed with the alkaline saliva and hence a disturbance of the physiological functions of the stomach is more than apt to ensue, especially if this habit be pursued indefinitely. This must be corrected as much as possible in the individual case. A small amount of food should be taken in the mouth and chewed until it is mixed with saliva, and if this is thoroughly done swallowing becomes almost an automatic process, that is, the food practically swallows itself. When this method is first begun it takes time because the saliva responds to the new demand slowly, but if it be continued and the drinking during the eating be very largely omitted the saliva will after a while respond instantly and copiously and then the time consumed in eating will be very little if any longer than formerly. This is so because in the old way the amount eaten was more in conformity with what was customary, while in the new way it is appreciated better when the appetite is appeased and the total quantity ingested is less.

When the food reaches the stomach and intestines the physiology of these organs must be looked after very carefully. X-ray studies have shown surprising conditions. Drs. Pancoast and Pfahler in 1907 published diagrams of the various positions of the abdominal viscera, showing to begin with, that they occupy a position much lower normally than was formerly supposed and also that a ptosis of any or all of these organs was much more frequent than ever imagined. With

this study to stimulate, it is rather interesting to note the difference in position in living (x-ray) anatomy and dead anatomy (cadaver), although observers differ. I think it is rather lower than indicated in the work of Pancoast and Pfahler in 1907. Dr. Pfahler, in his communication, states that as regards the stomach he considers that its position is not of so much importance as its motility. I entirely agree with that statement, because in the x-ray pictures it is very apparent that the stomach is simply a bag hanging in the abdominal cavity and unless so low that the transverse colon gets caught above it (rather rare) its physiological activity is not so very much interfered with by the position alone. In women where corsets are worn the waist line constricts just at the neck of the stomach and interferes with its function very much. It is by this means that its tonicity is more often interfered with. In the same manner x-ray studies have shown that corsets by waist line constriction, and outward, downward shelving elongates the liver.

Thèse pour le Doctorat en Médecine.
Par Henry Béclère
"Le Radiodagnostic des Affections
des Foie."

Feb. 24, 1910.

The liver and spleen are very important organs and should come in for general treatment. It is in the ptosis of the intestines and particularly the transverse colon and its interference with their physiology that great importance is attached. With a marked ptosis of the transverse colon the long curve of intestines hanging down from its two great flexures there results necessarily the following: With the constriction of the intestines at the flexures which must be produced by the weight of the down hanging or dependent portions there takes place at once a loss of tonicity of the structures between these two points. Also whenever there is a sagging of the gut in this way it has been demonstrated by one writer that nature immediately attempts to form and, as a matter of positive demonstration, does form small ligamentous strands beneath the sagging intestines. These strands extend in the direction of the circumference of the gut and thus attempt to hold it up and prevent further ptosis. These strands are separated by short

intervals, which make a series of very shallow depressions between them and hence a series of shallow catch places. With the constriction at the flexures there must result a slowing of the food stream in its passage through the intervening gut and the succession of shallow catch basins holds back small amounts of the food stream and in a way may be compared to small stagnant pools by the side of a brook.

An article by Drs. Hartwell and Cecil, entitled "Intestinal Diverticula," appeared in the *American Journal of American Science* for August, 1910. They show that these diverticula are more commonly found than formerly in the autopsy room and they consider that the etiological factor is, "some change in the resistant powers of the gut wall. The fact that diverticula occur in old people, in people whose intestines have been more or less worked out, as evidenced by constipation, points to a muscular deficiency, and in this muscular weakness the cause of the formation of diverticula must be sought." The traction on the ptosed intestines produces a muscular weakness and an atonic condition of the gut. Under these faulty physiological conditions it does not require a very vivid imagination to see taking place a marked disturbance and interference with osmosis, fermentation, development of diverticula, formation of bacteria and toxins and with their absorption diseased conditions necessarily resulting, including the hypertrophic type of chronic joint diseases which is under discussion.

In treating these conditions it is, I think, easy to understand why the administration of lactic acid, intestinal antiseptics (Beta Naphthol, Salol, etc.), or the use of vaccines may give some benefit, but it is also just as easy to understand why such treatments are of benefit because they neutralize the products of faulty physiology, while they are being used and that their effect ceases with their discontinuance. They do not overcome ptosis, they do not do away with constriction of the lumen of the gut, they do not obliterate the continuous series of shallow sacs, as described above, therefore they have no effect whatever on the etiological factors which I have attempted to set forth. If this be true, and a larger and larger experience in these cases makes me feel that it is absolutely true, then the treatment which really attacks these etiological conditions must be methods which will produce the real cure.

In the treatment of these conditions there must be produced

elimination of toxic material from the tissues locally and a stimulation of the physiological processes to perform their duties in a normal or more nearly normal manner. The role of mastication and the saliva has already been touched upon. In woman the support of the abdominal contents becomes of very great importance. This should be done by adjusting the corset, that is, making an extension to the corset and running the clasp or front steel from the very bottom point upward. When it is finished it should be a complete and continuous corset and not a band. This supports the abdominal contents mechanically.

In man, if the process is in a later stage, a pelvic corset may be necessary, while in the early stages it is probably not necessary. In an acute condition perhaps a plaster jacket would give as quick relief as anything. This could be worn as a solid jacket for a sufficient length of time, perhaps a week or two, when it could be cut down and by binding made to lace up in front. In this way it would be possible to remove it for treatments which should be given three times weekly. The jacket could probably be omitted after a short time, but as in some of the very tender cases, if it should be longer necessary a perforated leather corset might be substituted. The treatments consist of physiotherapeutic measures, no one modality alone usually giving as much benefit as a combination. In the early stages of infiltration I prefer a combination of the Morton wave current followed by sparking, then the use of general vibration as well as local. For the application of the wave current a lead electrode of sufficient length to cover the affected area should be used and the duration of the treatment be about twenty minutes. This followed by sparking, pressing the selector deeply into the tissues on each side of the spine. The use of vibration is very important and if I could only make use of one modality that would be my preference. The hard ball is applied with deep pressure to the spinal nerve centers. The soft brush is then used over the liver both back and front; the liver is an all important organ and must not be overlooked. The soft brush is continued over the splenic area, the stomach and in general the whole abdomen. Lastly, the hard ball is used with deep pressure over the abdominal lymphatics. This stimulation of the spinal nerve centers and almost direct application to the abdominal

organs stimulates the nerve supply and tones up the musculature in a really wonderful way.

Grodel has demonstrated that vibration does this much more efficiently than massage. Physical exercise is also an important part of the treatment. For increasing the flexibility of the spine lateral bending with resistance is an excellent method. The weight and pulley may be used for this exercise with the handles held over the head bending first to one side and then the other. Backward bending may be also employed with the handles out over the top of the head. In women an abdominal exercise is used to develop the strength and tone of the abdominal muscles and thus by nature's means hold the abdominal contents higher and with freedom from strain on the flexures. The muscles may be contracted at the same time with breathing exercises and then allowed to relax, repeating the exercises and increasing the number of times it is done.

In some cases one modality may not accomplish as much as desired and other measures must be employed. The application of the 500 C. P. incandescent light along the whole length of the spine, both for the stimulating effect of the rays of light and the congestion due to the heat proves very beneficial in some of the cases. The local hot air bath covering the affected area or in suitable cases the all over bath is very beneficial, also the all over electric light bath may take the place of the incandescent local bath. Now and then a case where the wave current and sparking is disagreeable the effleuve as delivered by a coil, may be of great benefit. Towards the end of the application sharp sparking may be administered for its stimulating effect. This may be followed by general vibration or the high C. P. lamp and general vibration. In the late stage of encrustation there may be quite marked deformity, a curve of the spine. This deformity may be overcome by placing the patient, back down, on a suitable frame with some of the curve corrected, while in this corrected position a plaster of Paris jacket is applied; after wearing this jacket for two or three weeks another correction and another jacket. In this way more of the cases may be straightened up relieving pressure on the nerves at the same time and thus causing the pain to disappear. Climate also has an important bearing upon these cases; near the seashore it is more than apt to be damp and

patients do much better inland, where there is freedom from fog and the humidity is not so troublesome.

With these methods of treatment the early stage or infiltration stage is curable. If only a moderate amount of encrustation has taken place the spine can be righted up, the infiltration and thickening largely diminished and the patient made to feel that for all practical purposes he is well. In the aggravated cases, spines may be straightened up, pressure largely relieved, pain made practically to disappear and life made worth living a little longer.

Discussion.

J. J. Kindred of River Crest, Queens Borough, N. Y. City.

We are all very much indebted to Dr. Peckham for his contribution on this important subject. I have had two such cases. One of them belonged, I believe, to the so-called distal form, if I am correct in my understanding of the proper classification of the subject. That case was treated with static electricity for some time, with most excellent results. However, for one reason or another the electricity was discontinued, and the patient sought climatic treatment. Going to the arid regions of the Southwest, namely, to the Colorado desert, improvement was very prompt and marked, and almost total recovery resulted therefrom. There is, however, as I understand it, another form, a very rapidly ossifying condition, which leaves the patient helpless, and the progress of which is exceedingly rapid, and the treatment of which is most hopeless.

Dr. William B. Snow of New York. I have been much interested in Dr. Peckham's paper and the way in which he has considered the subject. He has gone, as all of us must hereafter, to the bottom of the subject. He has taken up the etiological factor, and we must always so consider the definite causes and study to discover them in all cases. The papers of Dr. Bassler and Dr. Pitcher and Dr. Peckham have all pointed to the importance of recognizing the intestinal tract, directing attention to the importance of correction of intestinal and digestive disturbances, the fermentative conditions. These are the most common cause of the chronic joint conditions.

A measure of value in the treatment of the intestinal troubles is radiant light and heat applied with the high candle power incandescent lamp over the intestines. It is remarkably effective in limiting the activity of the intestinal flora. I want to accentuate the fact, that the application of combined radiant light and heat for a long time over the abdomen, as well as to the site of the lesion, is productive of great benefit

in the treatment of joint affections. I think this is one measure that Dr. Peckham did not include in his suggestions.

Another measure which I find of a great deal of help in these cases is direct d'Arsonvalization. The heating effect improves nutrition and circulation throughout the abdomen. It is remarkable how cases of intestinal derangement improve with that treatment. It is the effects of hyperemia upon metabolism, the improvement of the nutrition in the resistant processes, which aids in removing the vicious conditions present.

The diet is important, and also the regulation of the habits of the individual, particularly as is being emphasized so much in this meeting as to the quantity of food taken, cutting down the diet to the absolute requirements of the economy, and holding the patient to that sort of a diet, as well as a judicious selection of foods which make for the correction of the conditions, which, as Dr. Bassler so well stated, must be regulated to the individual conditions of each patient. Diet is a study, and there is no more important study in medicine.

I quite agree with all that Dr. Peckham has said with reference to the physical treatment in all other particulars.

I would ask Dr. Peckham if he does not find in these spinal joint conditions contraction of the muscles along the spine as a result of the inflammatory process, and if the application of the wave current and sparks to the muscles does not relieve the tension? I have always found that in the treatment of joint inflammation, that the relief of the muscular tension removes the tendency to hold these joint structures tightly together. By relaxing the muscles we relieve the tension which impairs the freedom and motility of the joint, and also impairs the nutrition of the joint structures.

Dr. Charles O. Files of Portland, Me. I want to say two or three words about the roller electrode. If those of you who have neglected its use will go home and use it you will find it of great value for application to the spine for diagnostic purposes and to the abdomen, as well as for treatment with the sinusoidal current, the galvanic current and the faradic current. The early diagnosis of these spinal cases is a great advantage to the patient and to the doctor. The early diagnosis is difficult. The patient does not know he is sick until the disease is well advanced, when he can describe the classical symptoms. And so with intestinal putrefaction and a great many diseases, you find them with the application of the roller electrode. A young man of excellent family had epilepsy at intervals. I put one electrode into the rectum and the other over the large intestine. A red spot appeared over the gall bladder and on the spine at the base of the brain. As a matter of diagnosis and making an early diagnosis, the roller electrode is invaluable.

Dr. J. C. Walton of Richmond, Va. I want to thank Dr. Peckham for his admirable paper. I want to relate a case. A colored trained nurse who had had an attack of cerebro-spinal meningitis came to my office. She was very thin and run down. All the upper cervical region seemed to be a bony deposit running up the base of the skull. She had constant pain, and could not move her head. She was sent to me as a test case by some of the physicians. I believe sometimes it is wise to try one modality thoroughly so as to find out what it will do. If I try a dozen different remedies I do not know which one produces the cure. I commenced treating that woman with the wave current, and she made a complete and perfect recovery. All of those apparent deposits disappeared. The hardness along the sterno-mastoid muscle went away and also that over the clavicle. Her general health improved wonderfully without any other treatment whatever. I report that just to show what the wave current will do if persistently used. I think it would be well in cases at times for us to limit our efforts to one modality and see what it will do.

This observation does not apply as a criticism to the Doctor's most excellent paper and to the treatment of many conditions where the physician has to combine all of the physical agents.

Dr. Peckham in closing. The clinical treatment is very important, and climate does have an effect on chronic joint diseases. I know one patient who was having considerable pain in both knees. She left the Atlantic coast, went up into the Rocky Mountains, and the pain completely disappeared. As the Pacific coast was approached the pains returned. I believe that climate does have something to do with it. If the patient could find the right climate, he might be free from trouble. Joint trouble develops in every climate, though I know that humidity does affect it.

It is the stiffness and tenderness of the muscles which limit the motion of the spine.

One modality is all right if you are experimenting and anxious to see what that one will do, but if after a thorough trial of that one modality you have not done your patient any good and you lose that patient, you are perhaps sorry that you did not try a combination. In my hospital work if I am thrashing out one thing I use that one thing. That is scientific and experimental, but when you come to your patients you want to do all you can for that patient, and therefore a combination of methods does not give better results than any one modality.

SOME LABORATORY FINDINGS IN DISEASES OF METABOLISM WHICH QUESTION THAT THESE ARE PRIMARILY OF METABOLIC ORIGIN. THE ROLE OF CHRONIC INTESTINAL DISORDERS IN THE PRODUCTION OF SOME OF THEM.*

BY ANTHONY BASSLER, M.D., NEW YORK CITY,

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New York City.

From the first era of medicine, which begun with the dogmatic teachings of Hippocrates (B.C. 460-377) and Galen (A.D. 130-200), through the establishment of the empiric era which begun in the sixteenth century by the introduction of anatomy, learning from experience, and deductions from metaphysical assumptions, up to rather recent times when its establishment on a scientific basis was inaugurated, is a course of about 2400 years. Yet, only during the last winter, on a subject in which science was elucidating much, the reader heard some of the most prominent men in medicine argue vehemently in favor of speculative theories rather than accept stern and unanswerable physical and biological facts in connection with the etiology of that particular subject. It is no idle or worthless prediction of mine that future medicine will be developed from the laboratory more than from any other quarter, because from this source medicine comes with logical tread, open eyes, consciously, free from dogmatism, and dependent upon facts.

To the so-called constitutional diseases of obscure origin or those of metabolism, serious workers in scientific medicine will add their greatest quota in the coming years. Already these facts now stand before us; the endogenous intoxications due to parasitic and bacterial origin in the alimentary canal or general system; the association of certain neurological affections with gastrointestinal causes; the anæmias due to gastrointestinal affections; nephritis and hepatitis of chronic forms due to gastrointestinal reasons; suboxidation of the body as a

*Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association, at Saratoga Springs, N. Y., September 14, 1910.

cause of obesity; the role that the thyroid bears in cretinism and myxœdema; the excess production and diminished power of the elimination of uric acid in gout and its establishment as a disease of intermediary purin metabolism; the excessive combustion of sugar in Graves disease; the shortage of the ability of the body to convert absorbed sugar into glycogen or for the tissue cells to store it in glycosuria, and the pancreas and liver lesions in diabetes mellitus and the role that the acetone bodies bear to severe forms of these affections; the importance of the intake and output of foods, and the nitrogen, sulphur, phosphorus and carbon balance in nutritonal disturbances; the role of bacteria in septic and infectious conditions; and many others.

The conditions I wish to draw attention to at this time are the states of chronic intestinal putrefaction, the most numerous of all medical disorders in man. Etiologically, the long established condition is responsible for more permanent types of change of the highly specialized internal organs than all other factors put together, and it is more than possible that future years will show that many of the diseases classed to-day as of obscure origin will be understood to be directly or indirectly due to states of chronic toxemia from the intestinal canal. At the present moment it is evident that by far the largest number of the following are of intestinal origin in their establishment; chronic myocarditis; essential asthma; chronic nephritis; chronic hepatitis; chronic cholangitis, cholecystitis and cholelithiasis; chronic gastric and intestinal atonies; chronic low secretory and motor conditions of the stomach and intestine, and excess sensory conditions of the first; the mysterious peritoneal and omental adhesions; chronic constipation of dynamic and atrophic origin; chronic colitis, from the simple catarrhal to the membranous and atrophic forms; chronic intestinal indigestion with fat, sugar, and starch intolerance; arterio-capillary fibrosis and chronic hypertension without sclerosis; premature senility; pseudopernicious anemia, and the true types following gastrointestinal atrophy; chronic simple anemias; gout; intractable neurasthenia; habitual headache. insomnia; catarrhal affections (particularly the general forms with atrophy of the submucous tissues); chronic backache; debility; neuralgias: loss of sexual power; loss of weight and strength; mental fatigue on slight exertion; mental confusions; exces-

sive emotional depression and irritability, semi-invalidism; vaso-motor disturbances; degenerative states of the central and peripheral nervous tissues; functional eye conditions; hypertrophy of the lymphatic tissues; atypical rheumatism, myalgia, and polyarthritides or arthritis deformans. The reader has seen so many of the mentioned disorders associated with chronic states of excessive intestinal putrefaction, and his observations from treatment of intestinal conditions have been such, that he is now strongly inclined to the belief that many of what we have been classifying in the past as clinical entities are after all only resulting conditions from a chronic state of disorder in the intestinal tract, which, very generally, is bacterial in nature.

It is not transcending the facts when I definitely state that nowhere in internal medicine is there such a widespread ignorance and such poor work being done as is present in the study, analysis, and therapeutics of these disorders. To make an assumptive or speculative diagnosis of some form of intestinal disorder and go no further than this in the way of analysis of the case as to just what this may be, to symptomatically treat a constipation or anemia or check a recurring diarrhea, to employ a so-called but misnamed intestinal disinfectant, to treat by any single means a local pain or distress or physical condition of an organ, or order these patients to sanatoria for treatment, to employ a single diet for all, such as the milk, vegetarian or the still more ridiculous instillations of the Bulgarian bacillus into the stomach, in my opinion, fall far short of rational medicine and our duty to these essentially chronically afflicted patients. Of what value are such diagnoses as indicanuria, intestinal indigestion, intestinal fermentative dyspepsia, habitual constipation, autointoxication, and many others still more vague? When we note a marked oedema of the ankles in a case we do not make a diagnosis of dropsy and go no further. We immediately think of cardiac, renal or hepatic disease and continue examination accordingly. Nor do we say "Oh! the illness you have is a chronic cough," but we at once think of the lungs and examine these organs. Then, why not the same detailed work in the examination of cases of chronic intestinal putrefaction? For after all every argument against them are merely sidestepping excuses on our part. It is here that the value of the laboratory

comes in strongly. Not the kind of superficial and worthless clinical diagnosis work that is being handed out to medical men to-day, but a quality and character of work that goes to the very limits of, first, the scientific observation and preparation of the patient on our part, and then the very heights of laboratory technique in chemical and bacteriological work on the laboratory side.

To arrive at these diagnoses, the histories of the patients must be gained in all their important details, the examination must include every organ of the body that can be judged by clinical observation, diets must be made use of over days of time and the stools and urine be examined exhaustively, carefully, and competently. As the pediatricist does when artificially feeding the infant, we must know just what and how much is going into the alimentary canal, how this is disposed of in the body, and how it comes out in the changes it undergoes as shown in the stools and urine. Many men are doing good work in histories, physical examination and clinical observation of the patients. Yet, how few there are who understand the foundation principles of dietetic and vaccine treatments as based upon the bacteriology and food loss or perversion in stools and the constituents and their amounts in urine in as these represent abnormal states in the alimentary canal or organs allied to digestion, or adventitious heat and energy production and physiological chemistry of the general body?

Everyone sitting before me this morning has had many cases of this kind under observation in the past, in which, by means of hygiene, baths, water, dieting, electricity, light, drugs, and so forth, your patient was improved, only to arrive at a point when, figuratively speaking, you were barking up a tree. You made a good run with the game in sight and felt that you might get it at any moment, but now you are abreast with a solid and fixed proposition. Conscientiously, you cannot discharge the case, because, even if you felt that you can do more in the way of a cure with the agents that have served you in the past, to leave this case out of your hands there will sooner or later be a recurrence of the conditions you originally began the treatment of. It is at this point that the value of scientific dieting and change in the bacteriology of the gut comes in, and these are my reasons for the presentation of this paper.

Obviously, in the few moments at my disposal I can mention only very little regarding these. A few of the cardinal points on the way to construct a diet, which in each case is different, are, to give foods in amounts just up to what the patient can normally utilize and requires, and of such kinds as are indicated by examinations of the feces and urine; to avoid excess collection in the colon of proteins, fats or carbohydrates as the case may show are quickly putrefied or fermented when accumulated there; to work down a high conjugate sulphate partition of the urine when this runs greater in ratio than 10 of the performed to 1 of the conjugate; to keep your nitrogen foods just down to the running nitrogen excreting power of the urine in that case; to base your diets on a caloric principle of feeding, construct simple diets of a few foods which are representative of the different food constituents, which you can change in character and amounts easily, and to make them eat in quantities according to the scale standing beside their plate on the table. The foods, which can be variable in selection, in the first two to three weeks should be just short of full nutrition, and after that maintained at the physiological level for that individual. Patients must be made to cleanse their mouth before and after eating, all foods should be well cooked when possible, cleanly served, and cut fine on the plate and well masticated. Time should be taken so that hasty eating is avoided, and a rest of a while after the heavier meals is desirable.

In the *Medical Record* of a coming issue (September 24, 1910) the reader will advance his first article on a new method of treating chronic excessive intestinal putrefactions by the instillation of live bacteria, grown from the patient's or others stools, and delivered in billions and trillions into the rectum at intervals of a few days between the injections. The treatment is both vaccine and anti-vaccine in nature, and is established on the principle of equalizing the relative proportions between the Gram positive and Gram negative organisms according as departures from normal are noted. At the present time the reader has cases that are being successfully treated with the different injections of strains of bacillus coli communis, bacillus aerogenus capsulatus, bacillus aerogenus lactosus, bacillus bifidus, and mixed autogenous organisms grown from patients' stools

or from those of normal individuals and injected into the sick. Being the pioneer in this, the work of blazing the way to be scientifically done is slow and tedious. But as definite facts are noted they are being compiled and will be given to my professional brethren for general utilization. From a beginning which was doubtful and only experimental, I have overcome my inherent conservatism, until to-day I stand before you a most marked enthusiast. I have already acquired enough brilliant jewels of therapeutic results from this mine I have opened, that to enumerate the changes that have been wrought in some of these cases without showing you the individuals and hearing their histories and observing the present changed conditions, would be too much like the results that Aladdin gained with his wonderful lamp for you to believe. But, gentlemen, the etiology of many of these past obscure conditions is intestinal in location and bacterial in nature. Being present mostly in the colon, the rectum and the antiperistalsis of the colon, which can carry fluids injected into the rectum to the ileocecal valve is not over fifteen minutes, gives us the direct means to attack them. Whenever the quota of the different intestinal organisms can be brought approximately to normal, the general body quickly responds, symptoms disappear, organs and less highly specialized tissues take on a healthier tone and function, normal physiological and physiological chemical changes of the general body are established, and with these, the katabolic and perverse metabolic conditions disappear.

126 East 60th St.

Discussion.

Dr. G. Betton Massey of Philadelphia. I was interested particularly in the protozoar as well as in the bacterial contents of the intestines, for some of these are animal organisms as well as vegetable. I want to allude very briefly to the fact that about a year and a half ago I conceived the possibility of a case of very recent epilepsy in a young man of twenty-four being of intestinal origin. On consulting Dr. Mills of Philadelphia he told me a man abroad had written a book on that point of view. I had this patient's intestinal contents examined by an expert, and he found a great many crawling things there. He was placed on intestinal antiseptic treatment and galvanic stimulation of the abdomen, and he had no convulsions from some time in January until some time the following January.

I must take issue as to the value of intestinal antiseptics because I happen to know of an extremely valuable intestinal antiseptic. It is valuable because, unlike many intestinal antiseptics so-called, it reaches the intestines and stays there. It is betanaphthol-bismuth. Unfortunately it is only made in Germany, under the name of orphol, by Schering & Glatz. A half teaspoonful taken before breakfast will kill out these flora or fauna in a very short time in many of these cases.

Dr. John W. Torbett of Marlin, Texas. I think the Doctor's paper has struck at the very foundation of the cause of disease. We have heard a whole lot about auto-intoxication. I think in a great many diseases we are dealing with the effects. They talk about the liver giving these effects. Where does it get into the circulation? Why, from the portal circulation from the stomach and bowels. One of its great functions is the elimination of bacteria from the system. When it gets out of order from over-work go back to the cause. Malaria, yellow fever and dengue come through the skin due to the mosquito. The other diseases must get in some way, and the alimentary tract is the most natural way. They may come from overfeeding, or they may gain entrance through the nose and throat or even from the urethra as bacteria. I have seen a number of cases of rheumatism due to stricture, from retention and absorption of toxines and bacteria back of it. He struck at the very foundation of the cause of the majority of our constitutional chronic diseases. There is an infection added to the blocked up, imperfect katabolism. You may cure the disease, but if you do not remove the pathogenic bacteria and correct the diet, you have done little good. All of us cannot get the use of a laboratory. I have a good laboratory, and I am doing better work, and I expect to do still better work.

The best intestinal antiseptic I have found is the commonest and simplest—castor oil and turpentine. It often quickly relieves a headache. I give one teaspoonful of castor oil and four drops of turpentine every night for weeks. I have had remarkable results with it in several cases of pellagra. Some have been well for three years. I use it in every case of dysentery. The doctor who tries to cure the disease without removing the cause is harming his patient.

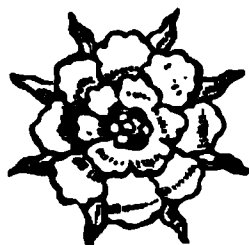
Dr. William B. Snow of New York. I am glad that I asked Dr. Bassler to read this paper. He has been co-operating as my consultant in a number of cases of intestinal origin, and I want to attest to his good work. The reason I wished him to read this paper before the Association was to aid in turning the tide in the right direction. We do physical work mostly on the outside; Dr. Bassler is doing his on the inside. I have had occasion to test his treatment in three or four bad cases of intestinal perversions in which he has used injections of

colon bacilli. The results have been very satisfactory. It is the matching of one germ against another, and keeping a balance between the different types of bacteria in the intestinal tract. His discovery, that by placing colon bacilli in the rectum they will pass up to the coecum is important. Dr. Bassler is the pioneer in this method of therapeutics.

Dr. J. C. Walton of Richmond, Va. In speaking about intestinal antiseptics, do not forget water. That is the best and simplest of all of them. Flush out all the emunctories by copious water draining, lavage, and colonic irrigation and follow by a brisk mercurial cathartic. "Clean up, clean out, and keep clean."

Dr. Bassler in closing. I do not know what those "crawlers" were that Dr. Massey had reference to. Evidently they were some protozoa, or possibly parasitic, and in those parasitic cases intestinal antiseptics do work well. But, gentlemen, the intestinal tract is twenty-five feet long, and when you try to change the bacterial content of the intestinal canal with beta-naphthol-bismuth or anything else you've got a proposition on your hands that you will never succeed with. You can make a little impression, but you will never cure the condition. In my experience the best intestinal antiseptic that we have to-day, the very best one, is the cheapest and the oldest—calomel one-tenth grain three times a day, not as a purgative, but given as a steady treatment.

J. J. Kindred of River Crest, Queens Borough, N. Y. City. When you are considering intestinal asepsis and antiseptics do not forget that relieving the intestinal canal of all food for twelve to fourteen hours is the best preliminary treatment to the thousand and one antiseptics.



INFANTILE PARALYSIS.*

BY ALMERIN W. BAER, M.D., CHICAGO, ILL.

Epidemic spinal meningitis resulting in infantile paralysis is an infectious, communicable disease, having a mortality of from 5 per cent. to 25 per cent., while 75 per cent. of the patients surviving are more or less permanently crippled. This disease should come under the ban of compulsory notification, because of the rapidity and ease with which it spreads and the dire results left in its wake.

For the bibliography of this dread malady I will refer you to the whole of this year's numbers of the *Journal of the A. M. A.*, almost every number of which has either an original article or an abstract on the subject; *The Western Medical Review*, Omaha, Aug., 1910; and the exceptional report on the occurrence of infantile paralysis in Massachusetts in 1909, reported for the Massachusetts State Board of Health by Robt. W. Lovett, M.D., of Boston, in the *Boston Medical and Surgical Journal* of July 14th.

For the common treatment of this disease to-day I will refer you to the symposium on the subject by the American Orthopedic Association held at Washington, D. C., May 3d to 5th, 1910. Here the consensus of opinion still favored the use of the plaster cast and the transplanting of nerves and tendons. While Flexner's serum *may* be a specific, the inability to see the patient when first attacked, or even to recognize spinal meningitis in its early stages prevents the free use of the serum even if it were readily obtainable.

My experience with the treatment of this disease has been an effort to repair the damage caused by the destruction of the spinal nerve cells. When we remember that the numerous cells in the spinal cord are the source from which the various group of muscles are innervated, and that probably no patient lives when beyond a certain number of these cells have been destroyed, it is but reasonable to believe that the treatment of *infantile paralysis* should begin with these. As there is always more or less anastomosis among the spinal nerves it is al-

*Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association at Saratoga Springs, N. Y., September 13th, 1910.

ways possible by proper treatment to get better and better action from these with electrical stimulation.

Treatment of this kind and its results depends on the electrical modalities and the personal equation. In my work I use both the direct current and the static breeze and sparks. As I told you at St. Louis several years ago, I never use as high as 110 volts (in fact I seldom run over 60). My method of treatment is to use a large pad extending above the point of injury in the spinal cord to sometimes as low as the sacrum with a double cord connection on the calves, placing the active pole on the spine for ten minutes. I then change the polarity and put on the interrupter for another ten minutes, always giving the patient as much current as he can take without being burned. This treatment should be given two or three times a week, preferably three times. (I never use the direct current on a patient oftener than every other day.) These treatments are always followed with a static treatment, which may be given every day if desired.

J— was attacked with spinal meningitis at the age of thirteen months, which resulted in infantile paralysis. When I saw him at the age of fourteen years he had no use whatever of his legs, both arms were affected some, and when the brace was taken off he showed the most deformed body that I ever saw. His trunk fell into the pelvis to such an extent that his head only stuck out. After eight months' treatment this boy discarded the brace of his own accord, and at the end of two years he could stand, although the left leg was several inches the shorter, owing to the great spinal curvature (which caused him to sit on the right nates entirely). He could go upstairs backward, down frontwards, take his own baths, go to the table by himself, take his wheel chair and go visiting, and also set type. This was certainly a great improvement over having to be carried to the bathroom, to the table, and to bed.

K— at 18 months was as able to walk around as any child of her age. She was taken with anterior poliomyelitis and it was 18 months later before she could stand and drag herself around by holding on to chairs, tables, etc. The usual casts and braces were used on this child until she was 17½ years old, at which time she was so sway-backed that her hips, when standing, were thrown back out of all proportion, and the left leg was so paralyzed that it was impossible to move the left

foot forward without swinging the whole side of the body. After only three months' treatment she lifts and extends the foot, and swings that side only from force of habit. She is now 50 per cent. straighter, and will eventually be almost entirely straight when the paralyzed erector spinal muscles have been sufficiently innervated to hold up the spinal column, which is perfectly straight when the hand is placed under the abdomen and pressed upwards, demonstrating conclusively that the injury is in the spinal muscles and not in the spine.

Paralysis cases are the hardest to get for treatment, owing to the apparent antipathy of the medical profession generally to everything electrical, and my experience and observation teaches me that stimulation and exercise is what these patients require most, instead of braces, which tend only to atrophy further the deficient muscles of these little patients, who grow misshapen when the muscles of the opposite side are allowed to beat the paralyzed ones in the game of growth.

In this same connection I beg your indulgence in reporting what was to me a very interesting case. A little girl of three years was unable to walk because of weak legs (probably a case of rachitis). She was put in braces, and she gradually learned to handle her limbs. At the age of 5½ years, just after getting new braces, she was brought to me, and I employed the same treatment as described above. At the end of five weeks this little miss discarded those heavy, unsightly impediments to locomotion; instead of in two years, as she had been told would be the case by the orthopedist on the day she first came to me. This was three years ago, and she has not worn her braces since.

1410 Heyworth Bldg.

Discussion.

Dr. William B. Snow, of New York. This is a subject in which I am much interested. I am very pleased with the general tone of the paper. The writer of the paper has struck the key-note with reference to not putting the affected parts at rest, and with reference to electing the cord as the site of treatment instead of the parts affected by the symptoms of disability. I believe that the static wave current is the most effective means as applied over the spine for twenty minutes daily in the treatment of these cases. If the lower extremities only were affected we apply it over the lumbar portion of the spine. If the cervical region and the lumbar were both af-

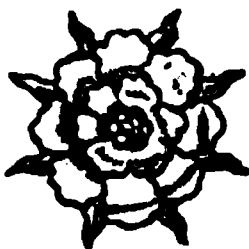
affected, it is applied to the whole length of the spine. Experience has taught me that these little patients will tolerate a very strong current, and that it is necessary to employ a very long spark-gap in order to get at the remote lesion of the spinal cord. Placed as it is within the bony canal and surrounded as it is with ligaments, it is most difficult to get a current of low voltage to that site. So with the constant current it seems almost impossible to get it there. The voltage of the constant current is so low and the resistance of the tissues which lie between the cord and the site of the electrode are such that it seems to me that if an electrode is placed on the leg and the other electrode over the cord that the current must follow the law of current flow passing along the path of least resistance, and pass down the muscles, instead of passing at all to the cord. We must study these subjects from the point of view of physics and the laws of electrical conduction. I have never resorted to the constant current in the treatment of these cases with a view to treating the spinal centers. And I am glad to see that the writer in his own treatment of cases has not confined himself to the constant current. He does not describe his method of using the static sparks. Whether he has applied them to the inter-vertebral spaces—a very wise thing to do; because they are more penetrating and the effect more pronounced in these cases than from the wave current, or whether he has applied them to the affected muscle. It is my custom to apply them to the back when the patient is old enough to tolerate them, because it is necessary to treat the local lesion, and also in the early cases to prevent the atrophy of the muscles. With peripheral stimulation applied to all affected muscles, employing methods that aid nutrition, such as radiant light and heat sparks and mechanical vibrations, it is possible, even though the limb does not at first recover its motility by the restoration of the nerve centers, to prevent atrophy. This will preserve the muscles and render them more apt to take on their function, when the central trouble will have been relieved. The writer's concluding observation, in reporting the case of a child that recovered, must be correct. Even in those cases in childhood that have gone for a long time during which the atrophy has been present we are not without hope. Before this society at the Atlantic City meeting Dr. Brower, in an interesting paper on this same subject, pointed out what seemed reasonable, and though a new idea, was justified by the cases which he reported. He said that, even in cases in which the central neurons might have been destroyed, there may be recovery in some cases long after the lesion, either from the taking up of the function of those centers by other centers, or by the development of new centers. He reported at that time one or two cases in which the atrophy had been a long time present, when we as a rule

are apt to say that the prognosis is so bad that no treatment would do any good, and yet those cases recovered almost a normal use of the limbs. I only mention this as pointing out a greater hope which should never lead us to discontinue the treatment and leave these little sufferers in such a deplorable condition without adding all we can to their prospect of recovery. But from my own experience with between sixty and seventy cases that we have treated, there was no case except those of over a year's standing in which there was not very marked improvement. And in the early cases I have yet to see one that did not make a complete recovery. I do not claim that this establishes a rule, but it has been my experience. Either these cases have been a series of exceptions, or a series of results based upon the fact that the same were liable to be obtained in all cases. I believe that that is the case, and that if we can get at them in the early stages of the disease that we may expect generally complete recoveries. Looking at the disease from the present point of view as infectious, we begin the treatment as soon as we can, because there are many things we can do in the infectious stage as well as the things we can do after the infectious stage. The fever usually subsides in three days. The treatment should not be delayed, for I have seen results which have led me to think that there is much we can do by inducing a general hyperemia early and thereby improve metabolism with radiant light and heat, and by applying the treatment early to the central lesion establish an early cure in these cases by promptly relieving local pressure.

Dr. Francis H. Humphris, of London, England. I want to corroborate what Dr. Snow has said. I had the pleasure some years ago of seeing some cases with him, and later I saw those cases. What he has said is perfectly correct. One thing we can do is to assure the parents that, while the bone has probably stopped growing, if we can do nothing else we can arrest the stoppage of the growth of the bone; that is to say, when the little patient gets over it there will be no further retardation of the growth of the bone. I had a case of two years and six months' standing. I promised nothing. The x-ray picture showed that the bone had stopped growing, but from that time on the bone went on growing. It did not overtake the other bone, and never will, but there was no stoppage of the growth after the commencement of the treatment.

Dr. Thomas H. Cannon, of Baltimore, Md. I recall a case that was somewhat interesting, inasmuch as the child had been suffering from marasmus. At the age of eight months the child was out in the park and the nurse let it slip from her arms. It struck on the edge of a bench and hurt its back. No attention was paid to it, until about a month later it was noticed that the child could not move its legs. It was taken to a hospital in Baltimore and put in a plaster cast. The X-ray

had shown no bone injury. The child after six months did not seem to improve. The mother brought the child over and wanted to know what I could do with it. Without making a diagnosis I put the child on the wave current. In these marasmus cases the spinal processes are rather prominent. I found it advantageous to use a wet pad and then a metal on the outside. This assures absolute contact with the spine. This child got the wave current on its back every day. A week later, though I was not expecting anything, the child began slight motion of its legs. Inside of a month's time the child could move its legs. It was six months before the child could make any definite pressure. The child recovered in a peculiar way. No attention was paid to the child's feeding, because he was under the care of another doctor. In one year's time that child was walking. I do not know the lesion in the cord. It was seven months after the initial injury. It shows what we can do with the wave current properly applied. We brought back to that child the use of its legs, and also improved its metabolism to such an extent that it is now going to school for physical culture to be trained in muscular exercises. I have mentioned this case to demonstrate the use of the wave current in children.



REPORT OF THE COMMITTEE ON STANDARDIZATION.*

WILLIAM BENHAM SNOW, M.D., CHAIRMAN.

For inhibition of excessive function cold would seem to be indicated; but where reaction is prompt, the contrary would obtain. Fatigue, induced by any over exertion of a part, would also produce an inhibitory effect. The means *par excellence*, however, for arresting excessive functions, is the administration of the Roentgen ray, which seems to induce inertia by inducing contraction of the cells. In hyperidrosis, hyperthyroidism, hyperchlorhydria, excessive sexual inclination, excessive menstruation, and other excessive functional conditions, the Roentgen ray, locally applied, is the most energetic of all.

In abnormal muscular activity or convulsions, induced by spinal irritation, as in chorea and functional epilepsy, agents which induce a general diffusion of blood throughout the organism and at the same time tend to diminish the congestion of the meninges, are productive of the best results. Radiant light and heat, convective heat to the surface, and the application over the cord of the static wave current; or, during conditions of excitement, of positive insulation with a long spinal electrode, are probably the most efficient means of regulating hyperactivity induced by spinal congestion. Those who have used the hydrotherapeutic jet and the static wave current, or the concentrated pencil brush discharge over the spine, in conditions of spinal congestion, we are sure, have demonstrated the superiority of the wave current.

Efficient methods for destroying malignant neoplasms and superficial blemishes are numerous.

The methods of Massey by *zinc mercuric ionization* with destruction locally of the neoplasm, with the diffusion of mercury and zinc in the surrounding zone.

The Roentgen ray has now demonstrated its efficiency in the destruction of superficial epithelioma, lupus vulgaris and lupus erythematosus, and as an adjunct necessary in the treatment of all malignant processes by operative procedures.

*Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association at Saratoga Springs, N. Y., September 13th, 1910.

Radium has been demonstrated to be one of the most efficient means in the treatment of large round cell and giant cell sarcoma, as demonstrated by Morton, Abbey; Dieffenbach, in this country and numerous foreign authorities, and verified in the experience of the chairman of your committee. This agent possesses a wonderful effect in destroying these forms of sarcoma, and is also equally effective as the Roentgen ray in the treatment of epithelioma, lupus vulgaris, as well as having been demonstrated by Lewis Jones and others as efficient in the removal of angioma.

The methods by effluvation or fulguration and oscillatory dessication have also been demonstrated to be efficient, and are probably, of all methods, as efficient as any for destroying superficial ulcers, neoplasms, moles and condylhmata, as well as for the treatment of enlarged tonsils, and ulcerations in the mucous cavities of the mouth, rectum and bladder, as recently demonstrated.

Carbonic acid ice, a freezing method of tissue destruction, has also been demonstrated to be efficient in producing a local tissue necrosis and destruction of the various types of the same class of conditions.

It would seem, therefore, that in the treatment of these superficial troublesome conditions, there are an abundance of efficient means at command. The skillful technique of the operator in the employment of one or another of which will determine its choice, while most of them will prove efficient, in conditions to which they are best adapted.

Probably the treatment by the Roentgen ray is as efficient as the others, and followed by less scarring and pain, but requiring a longer process of treatment, and is often to be preferred, particularly in the treatment of epithelioma, and the types of lupus.

In the deep-seated or extensive malignant tumors the Roentgen ray is an important factor, and should always be used in connection with surgery, both before and after operation; but it is not practical to employ the x-ray alone in these cases.

The method of Dr. G. Betton Massey, by zinc mercury ionization in the treatment of these conditions, has proved successful in his hands. Probably no agent is more generally indicated than this in the treatment of malignant tumors of

the mouth and on the tongue, whereas, for application to the surface, marked scarring is apt to follow the operation. In the use of this method your committee believes that the Roentgen ray should be used before and after operation as in other surgical methods, at least following operation.

An impetus has been given, during the past year, to the treatment of *fibroid tumors of the uterus*, particularly of the intermural type, by the Roentgen ray. Freund, Schonberg, Pfahler, and others have reported very uniform results from the systematic employment of the Roentgen ray in this class of cases; and the members of your committee are able to verify these experiences and to report numerous other cases which have not already been published. It would seem, in a large percentage of these cases, that the Roentgen ray is destined to replace surgery, and should, in the judgment of your committee, be instituted in cases not nearing the menopause; either this or the employment of the constant current per vagina, as advocated by Dr. Massey.

As an agent which induces sterilization, and thus possessed of a limiting action on the reproduction of all forms of life, the x-ray is remarkably efficacious for the destruction of germs within the organism. The Roentgen ray, by its sterilizing effect, is undoubtedly a most energetic means of ridding the body of infection.

Radiant light and heat, and the high frequency currents are also active in ridding the body of infection by the induction of increased local phagocytosis, particularly of the types of streptococcic and staphylococcic, gonococcic and tubercular infection. Reports have been made during the past year indicating the probability that radiant light and heat are also destined to play an important role in the treatment of intestinal infection, including enteric fever, also in the treatment of pneumonia. There is no contraindication for the employment of these agents in these diseases, and it is urged that if possible they be given a thorough trial, and that institutions be provided with the means.

The maintenance of nutrition should be judiciously regulated by the education of patients and the public to an understanding of the proper amount and quality of food necessary to maintain nutrition under varying conditions and the dangers to the organism from errors arising from indifference and in-

discretion in this particular. No greater prophylactic measure can be suggested than the regulation of diet to the requirements or the physical demands of the individual.

It is believed by your committee that arteriosclerosis and its consequences are more often caused by excesses in the consumption of proteid foods and excessive quantities of food, than by any other irregularity of life. It is therefore a prerequisite in the treatment of all cases, as age advances, to insist upon the regulation of the daily intake as to quality and quantity to the demands of the individual, and particularly so if an early hypertension indicates a commencing inroad which will develop sooner or later into arteriosclerosis.

The hemostatic effects of physical measures are induced by the Roentgen ray, which produces a profound contraction of the arterioles and of the tissues they supply, as is evidenced by the contractions which follow the applications of the Roentgen ray, the mass contractions and the sense of constriction of the skin of the hand exposed to the ray, as though the hand were placed in an astringent alum solution. Clinically, the effects upon hemorrhage are demonstrated in the treatment of fibroid tumors and endometritis, tubercular hemorrhage, and ulcer of the stomach. The constant current also produces a hemostatic effect when the positive pole is applied to bleeding surfaces, as does also *hot water*, cold and effluviation when applied directly to bleeding points.

Ionization as a therapeutic measure, has been advocated from time to time for the purpose of injecting medicaments into the system. In the future the credence given to this method will depend upon the established success of those who employ it. Your committee, from personal experience and investigation, cannot feel justified in advocating their employment for administering other than the normal constituents of the human body, except locally of antiseptics or anesthetics, except by the process of metallic electrolysis as employed by the method of Dr. Massey referred to, and for the treatment of endometritis, hemorrhoids, trachoma and similar affections.

Your committee have sought in this report to include, either directly or by inference, most that has been determined to the present time, pointing to the rational employment of physical measures in therapeutics, in accordance with the standards

recognized by those who are most familiar with the indications and the methods of technique.

Discussion.

Dr. Francis B. Bishop, of Washington, D. C. This is a very important subject. Dr. Snow has covered a great deal of ground. I have followed him as well as I could, and have been highly entertained. He has spoken of the stimulating effect upon protoplasm. The subject is such a broad one that I suppose he forgot to mention another effect. He says one effect of stimulation on protoplasm is to change the shape of cells. Mild stimulation produces a contraction; strong stimulation causes paralysis of the protoplasm. Very strong stimulation will cause it to change its form and to die. Therefore, we have got to be very careful in the stimulation of protoplasm not to overstimulate. I believe many of our applications of electricity to-day are too strong. I believe in the mild stimulation of protoplasm. Again, he speaks of protoplasm being stimulated directly and not reflexly. There are other authorities who say that protoplasm is very strongly stimulated reflexly. The whole body is made of protoplasm. There is a function possessed by the protoplasm, particularly the muscle and nerve cells, that is not possessed by the nerve fibre; that is, of summing energy. We have upon the surface a series of cells which have the property of collecting impulses and impressions and transmitting them to the centers, and I believe that most of the effects that we get to-day when we administer our stimulus to the surface of the body are through the summing influence of the protoplasm in the central nervous system, the nucleated protoplasmic cell itself.

I am using the canopy now. I have a canopy suspended over my operating chair, and I use that instead of a cage. I have had some cases that were not very much benefited by the d'Arsonval current that have been very materially influenced by the static current as administered through this canopy. I thank Dr. Snow very much for his paper, and I think it worthy of our commendation. I think he is on the right line of physical study and practice.

Dr. J. W. Travell, of New York. There is no more important effort than that which attempts to specify the conditions in which certain agencies are of particular value. So many agencies are of value in a given direction. To the worker the question is, Which agency is of the greatest value? I appreciate very much this effort which is being made by Dr. Snow to standardize and indicate the modality or physical agent which should be used in a given condition. I wish also to lay before you a thing which, to me, was very confusing for a long time. It was a long time before I could harmonize in my mind statements and facts that certain currents such as the

wave current, the vacuum tube discharge, and others produce contraction, which was evident, and at the same time produce hyperemia. To my mind, hyperemia meant congestion and engorgement and swelling, and yet these currents were used to reduce swollen parts, such as a swollen prostate, a sprained ankle, and other congested conditions. It was not until I realized that swelling or chronic congestion of a part was due to an exudate, a fluid which had worked out from the vessels and lay in the interstices of the tissues themselves, and would remain there indefinitely, until forced out into the lymphatic circulation and in that manner absorbed. These currents, then, by contraction squeeze out the fluids and exudates which have caused the swelling and pain—all pain being due to pressure upon nerve filaments or nerves, and much pain being due to congestion rather than to solid growths, congestion being amenable to relief and removal by such agencies in a quick and easy manner. On the other hand, these rythmical contractions do produce activity in the part, and fresh arterial blood is brought to it in the circulation, and in that manner we have hyperemia, and we may have some engorgment with the circulating blood, but a final reduction of the swelling because the exudate has been removed.

Dr. Snow. When I spoke of contraction, I had reference to the action of electricity in draining tissue, in forcing out infiltrations.

Dr. Bishop. My remarks were not in criticism of the report.

Dr. Snow. With reference to protoplasmic contraction, I have been induced by a great many of the effects I have seen produced in different conditions to believe that the effect is protoplasmic. We found this verified in experiments upon muscle tissue that had been absolutely separated from any nerve supply and yet could be stimulated to contract. The reference that I made occupies two pages in Howell's physiology. It is shown there, that even in tissue that has been dead for a day or so, where degeneration has not taken place, and where the nervous connections are all severed, that the tissue is capable of stimulation. For that reason, I maintain that a muscular structure to which a current is applied may act from two sources, but that the stronger effect is probably protoplasmic.

FULGURATION IN AFFECTIONS OF THE NOSE
AND THROAT.*

BY F. M. LAW, M.D., NEW YORK, N. Y.

In this paper I will attempt to describe the use of high frequency current in the form of the short hot spark known as *fulguration*, which has its greatest usefulness in affections of the nose and throat in the reduction of hypertrophied lymphoid tissues occurring in the faucial and lingual tonsils.

I will not go into the cause or symptoms of the above conditions as I know you are all familiar with them; nor will I discuss the reasons for, or against, their removal, but will simply describe the method I use in their reduction when surgical measures are not advisable.

In hypertrophied tonsils of children, the preferable means is their removal by surgical methods as fulguration takes time and requires tolerance on the part of the patient. Besides, in children, adenoids always accompany hypertrophied tonsils, and these cannot be reduced by fulguration.

In adults, on the contrary, it is in many cases the best method as there is no danger of hemorrhage which is a very important reason, as in adult life the tonsil has become very vascular and, in the majority of cases, contains an abundance of fibrous tissue which surrounds and binds the blood vessels thus preventing their contraction, and if tonsilotomy is performed, this failure of the vessels to contract properly may cause a severe secondary hemorrhage, which may even be delayed several days.

I have seen patients apparently recover thoroughly from tonsilotomy and in forty-eight (48) hours suddenly have a serious hemorrhage from the site of operation.

In tonsilectomy, the danger of secondary hemorrhage is not so acute, but frequently adhesions form after the operation, between the pillars of the fauces, and the patient is just as uncomfortable from these as he was from the obstruction or inflammation of the tonsil.

Another preference for fulguration is, that it causes very little after discomfort.

*Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association, at Saratoga Springs, N. Y., September 14, 1910.

To illustrate this: Fulguration was used several times on a man of thirty-eight (38) years who had very large tonsils. I then fulgurated one tonsil and used the thermal cautery on the other. He came in again in a week and said the after pain was severe in the tonsil which had been cauterized and slight in the other. He would not let me repeat the experiment. The site of the fulguration had entirely healed while there was still a slough on the cauterized one.

In another case, one tonsil was fulgurated and the other cauterized until they were equally reduced. The cautery reduced more quickly but the patient made the same complaint regarding the after pain, and the ultimate result showed the stump of the fulgurated tonsil to be smooth and free from adhesions, while the cauterized one was left in ridges, was firmer and, strangely enough, he had tonsillitis on that side the following winter while the fulgurated one escaped.

In the reduction of tonsils by fulguration we have two types to consider:

First: the soft variety of tonsil in which there is an actual increase of the glandular structure and very little alteration of the connective tissue element. This soft variety, when found in an adult, is usually due to a chronic irritation from a gouty or uric acid diathesis and produces a tonsil in which the glandular thickening is regularly distributed throughout the gland, thus making a condition favorable for absorption, which is accomplished by the use of a spark of an intensity just short of producing a slough, thus inducing a hyperemia in the tissue.

The second type is of the hard lobulated variety in which there is an increase of the glandular structure, but a more marked increase of the connective tissue element with the formation of fibrous bands, thus making a condition difficult for absorption, necessitating a spark of sufficient intensity to destroy the fibrous element so that contraction and absorption of the glandular structure may take place.

This fibrous condition is brought about by the organization of inflammatory material and is found after repeated attacks of inflammatory conditions, producing an irregular fibrous formation which, on contracting, produces a lobulated form of hypertrophy. The fibrous contraction, being due to inflammatory change, always follows the use of the actual cautery so that if the soft variety of tonsil, of the true glandular type,

be cauterized, it is transformed into the hard fibrous type with the formations of adhesions and the possible resultant symptoms of a chronic pharyngitis, which is just as bad, or worse, than the original condition.

The current used may be taken from the high frequency coil of the transformer type of large power, from an induction coil and Oudin resonator, or from a high speed static machine, the current from the small portable high frequency coils not being powerful enough for use in a moist cavity when destruction is necessary.

The same objection is made to the glass plate static machine. To produce a destructive spark in the moist cavity of the mouth, requires so long a spark gap that the spark jumps across the break in the electrode handle and strikes the thumb of the operator.

The electrode used consists of a hard rubber handle with a break switch handy to the thumb, and a long curved hard rubber tip with wire leading through the center to extend just beyond the end of the rubber insulation. This insulation is usually thin on the tips and I place a piece of soft rubber tubing over the end of the electrode to prevent the current jumping to the palate or tongue.

The wire leading to the electrode must be of the heaviest insulated secondary type, preferably of the high tension automobile kind. It is heavy but absolutely protects the operator and patient from accidental shocks.

A long wooden, or glass, tongue depressor is necessary and no part of the patient must be touched by the operator during the passage of the current. Reflected light and a head mirror is the preferable illumination.

The tonsils are swabbed several times, at intervals of about one (1) minute, with a solution of ten (10) per cent. cocaine.

The machine is started with a spark gap of one-sixteenth ($1/16$) to one-half ($1/2$) inch, depending on the capacity of the machine and the effect desired, remembering that the intensity of the spark is greatly reduced as soon as the electrode is inserted into the moist throat.

Holding the tongue down, the electrode is introduced with the contact button open and when in the proper position the current is made. If the patient jumps, the button must be instantly released or the spark will touch the tongue. Al-

though there is practically no pain the sudden snap of the spark often startles the patient and he draws his head away.

In the soft variety of tonsil, and using a mild spark, small ænemic spots will appear at the site of each spark. Applications are continued until the entire tonsil is covered. Congestion will shortly appear and the tonsillar structure will become intensely hyperemic. The time necessary for their complete reduction, of course, depends upon the size of the tonsil, but takes from eight (8) to twenty-four (24) treatments. Applications are made twice a week.

In the hard variety, the sparks must be of greater intensity and the application continued in one spot until a slough appears. The entire tonsil is covered at each treatment. Applications should be made every week or ten days. The time required for their reduction varies from five (5) to twelve (12) treatments.

No after treatment is necessary in either case and the patient suffers no inconvenience beyond the disagreeable sensation of the cocaine, which disappears in an hour or so.

One case in particular which I recall was of a man forty-one (41) years of age with hard lobulated tonsils the size of walnuts. He had suffered from severe hemorrhage following an operation on his nose, so I did not dare use the tonsillotome. Twelve (12) treatments with the short hot spark, carried to the point of destruction, reduced the tonsils to the level of the pillars.

This same man had enlargement of the lingual tonsil which was reduced in the same way, only the non-destructive spark was used.

Reducing lingual tonsils or lingual varices is awkward but may be done with proper care.

The throat is thoroughly cocainized and the patient holds his tongue with a piece of gauze. With a laryngeal mirror in the left hand, the electrode protected by a piece of rubber tubing extending one-eighth ($1/8$) of an inch beyond the point is introduced into the throat until the end of the soft rubber tubing is in contact with the tonsil or varix, and the current made. The sparks, passing through the protected cavity of the tube, strike the tissue at the point intended. If the tip of the electrode is not protected the moisture leaks away the

current, or the spark jumps to other parts of the throat and may reach the epiglottis and cause a disagreeable oedema.

Mycosis of the pharynx yields readily to destructive fulguration as well as papilloma, fibroma, lupus and rhino scleroma.

I have tried to use fulguration in nasal conditions but the difficulty has been to get suitable electrodes to direct and control the spark to the point required. If the trouble is situated near the choana there is very little difficulty if the protected point is used, but beyond one-half ($\frac{1}{2}$) inch from the surface it is impossible to properly control the spark and, besides, vision is obstructed by the electrode.

In one case of lupus, involving the nasal cavity, the pharyngeal wall and soft palate, I used fulguration in the pharynx and x-rays in the nose with the result that the pharyngeal trouble cleared up in one-quarter ($\frac{1}{4}$) the time required for the nasal condition.

Progress in Physical Therapeutics.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

The Best Methods for the Control of Fever. Recommendation of Rectal Irrigation. By Wm. Lee Secor (*Southern Medical Journal*, November, 1910).

Fever is of interest to every physician who practices general medicine and the specialities; we all meet it, and should understand thoroughly its underlying causative agents and its control. Abnormal rise of bodily temperature is usually an expression of toxemia and it is the toxins and not the fever that does the harm. There is no question in the editor's mind but what the prolonged action of toxins is much more harmful than a prolonged fever, though it should never be forgotten that the temperature is simply an expression of the degree of toxemia. Granting that this be true, there are only two ways by which we may properly reduce fever—removal of the source of the toxin, and eliminating the toxins already produced. In a great many instances this means a proper cleansing of the intestinal tract, proper feeding and elimination through the various emunctories.

In removing toxins it should be borne in mind that no agent must be employed that will in any way depress the organism and thus do harm. In the application of cold, especially the cold bath, we have a means of combatting toxemia in an effective manner. The bath most usually employed is the full cold one, commonly known as the Brand bath, that is to say, a cold full bath of fifteen minutes' duration at 65° F., accompanied by friction. Where its technique is properly carried out, nothing is more effective in typhoid fever and other toxemias than this bath. The writer of the article was led to employ cold water irrigation per rectum, and the results obtained were of such value, both as to comfort, stimulation and reduction of temperature that he now employs it constantly in his febrile cases.

The technique is simple; either a glass or metal two-way irrigator point should be used, the ordinary rubber tube apparatus, found in nearly every home is all right for the water supply, and a piece of rubber tube about three feet long is needed for the waste. Hang the back of the fountain syringe about a foot above the level of the patient's body, if it is too high, the pressure stimulates peristalsia and makes the procedure unpleasant. Fill it with water at the desired temperature, let the stream flow a second to free the tube from air, then insert the point carefully, and turn on the water. A slight fullness or unpleasantness is felt by some until the flow of water is thoroughly established, when it passes away, then a sense of comfort usually sets in. After one or two irrigations the patients enjoy the procedure.

The length of the treatment will depend upon several factors; the effect produced on the temperature and the temperature of the water employed being the principal ones. The irrigation should be started with water at about 70° F. If this does not produce the desired result a lower temperature should be employed. The temperature by the mouth should be taken several times during the irrigation, which usually lasts from twenty minutes to half an hour. The fact should never be lost sight of that we are dealing with a powerful agent, and proper precaution should be taken against chilling or collapsing. The hot water bag at the patients' feet is usually gratifying. It is not wise to lower the temperature below 100° or 101° F. by this means, as there is a tendency for it to still fall somewhat after the irrigation is discontinued; and when the temperature is lowered below 101°, there is danger of chilling.

The results obtained from this procedure are only in small part due to refrigeration, the nerve endings of the rectum and sigmoid are richly supplied with sympathetic connections and it is the stimulation of these nerve endings to which our results are mostly due. In the interim between the use of the

irrigation, the cold sponge may be employed with great advantage. The writer states that he believes that this is the most powerful of hydriatic antipyretics.

Treatment of Typhoid Fever. By Cyrus J. Strong, *American Medicine*, October, 1910.

After a careful review of the diet, stimulation and other features of typhoid fever, the writer takes up the question of the treatment of the temperature and states that "hydrotherapy in some form is the means now so universally employed to reduce the fever, that it is needless here, either to argue in its favor as a principle, or describe it in detail." How often, oh, how often, must the fact be pounded into the crania of the profession that the least valuable point in the hydrotherapy of typhoid fever is the advantage derived by reducing temperature by the cold water treatment. As we have said lately in several editorials along this line, the fever is beneficial in a certain sense, is necessary and combative of certain toxic states; that the greatest advantage to be derived from hydrotherapy is the arousing of the nervous system, the invigoration of the circulation, the betterment of secretion, and the increased activity of elimination. He speaks very highly of the use of cold rectal irrigations, and in this is thoroughly in line with several recent writers, reviews of this treatment having appeared in the last two issues of the journal. He speaks of the great success and control of temperature by this means, and says that his results with the Kemp tube have been better, the temperature more perfectly controlled, the nervous manifestations relieved, and the patient comforted more than by any other form of hydrotherapy. It is obviously the treatment where profound cardiac disease, obesity, arterio-sclerosis and intestinal hemorrhage preclude the Brandt or other baths. In addition to the Kemp tube, he uses the ice coil upon the abdomen. In passing the reviewer would like to recall the fact that it is very essential to place a compass between the coil and the skin. For hemorrhage he recommends the local use of ice-bags and internal medicinal treatment. The article is a good one, and shows a tendency of the modern practitioner toward physiologic methods in acute diseases.

ORGANOTHERAPY.

EDITED BY I. O. WOODRUFF, M.D.

Antityphoid Vaccination.

In the *Journal of the A. M. A.*, November 19, 1910, Forster of the United States Army advocates antityphoid vaccination

to guard against the outbreak of typhoid fever in camp and on the field.

Nineteen per cent. of the soldiers in the Spanish-American War contracted typhoid, and he states it has been repeatedly shown that in the camps during summer manoeuvres, even under the best sanitary conditions at least one case of typhoid is likely to occur.

At least 3 per cent. of those who have recovered from typhoid are germ carriers and probably sporadic cases are frequently caused by contagion from such a source.

Protective inoculation has been used in the United States Army since March, 1909. In the 18 months following that 12,000 were vaccinated. No report is made on the frequency of infection as compared with the unvaccinated cases. A description of the preparation and the dosage of the vaccine follows.

The Treatment of Typhoid Bacillus Carriers.

Stone, in the same Journal for November 12th, discusses the subject of typhoid carriers; and after commenting upon the inefficacy of various intestinal antiseptics, suggests treatment with vaccines as the best method by which to render these individuals innocuous.

He cites at length one case of a patient who had symptoms of cystitis and a mild cholecystitis coming on about a year after an attack of typhoid fever. The *Bacillus Typhosus* was found in the urine. Following the administration of the vaccines the symptoms and bacilli disappeared and there was a distinct increase in the agglutinating and bacteriolytic power of the blood. The nearer to the attack of typhoid such carriers are treated the greater the chances of success. Some long-standing cases may not be at all improved.

Use of Typhoid Vaccines in Typhoid Fever.

Anders (*Jour. A. M. A.*, December 10, 1910) deprecates the use of vaccines as a routine procedure in the treatment of typhoid fever, inasmuch as the treatment is adapted only to selected cases; for each dose temporarily increases toxæmia by causing a lysis of bacteria, and in malignant cases this toxæmia is already too severe.

He has used this treatment in eight cases of typhoid in which there did not seem to be any contraindication, but has not met with any special success.

He thinks that this treatment may have value in certain selected cases, while it has a distinct field in the treatment of local typhoid infections, and in causing the disappearance of bacilli in typhoid carriers.

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERICK DEKRAFT.

The Treatment of Chronic Appendicitis with High Frequency Currents. By William Harvey King, M.D., *Medical Record*, Jan. 14, 1911.

Dr. King bases his experience on 42 cases comprising all cases he has treated since the autumn of 1907 to June, 1910.

Of these cases four were complete failures; two of these gave a history of syphilis.

Six were failures because the treatment had not a fair trial.

Six were partial successes.

Twenty-six were apparently cured.

He gives a detailed description of eleven cases apparently cured. The technique is as follows: A sheet of tinfoil four by eight inches is applied with great care to the back, opposite the appendix, to the bare skin; over this is a piece of block tin two by six inches with solid metallic wire connection to one end of the spiral over the appendix a piece of tinfoil four by four inches is placed, the skin being previously well moistened with soapy water. Next to this is placed a piece of block tin two by two inches with solid rheophore connection to the other end of the d'Arsonval spiral. A current of very high frequency of from 1,000 to 1,800 m.a. is turned on for thirty minutes. This produces a sense of mild agreeable warmth if the contact is perfect, otherwise burning pain occurs followed by the formation of burns of the integument. King uses a step-up transformer with condensers of pint sizes for his d'Arsonval current. He finds that a slight rigor and a rise in temperature of $1\frac{1}{2}$ to 3 degrees follows an application of 30 minutes' duration if a low frequency of alternation of 1,200 to 1,500 m.a. is used and if pus is present. This he considers of diagnostic importance.

There must be no attempt made to treat the septic cases. The catarrhal cases and the well selected chronic cases of congestion of some adhesions are undoubtedly best adapted to high frequency currents.

BOOK REVIEWS.

THE TREATMENT OF DISEASE. A Manual of Practical Medicine by REYNOLD WEBB WILCOX, M.A., M.D., LL.D., Professor of Medicine (Retired) at the New York Post Graduate Medical School and Hospital; Consulting Physician to St. Mark's and to the Nassau Hospital; Formerly President of the American Therapeutic Society; Fellow of the American Academy of Medicine and of the American Association for the Advancement of Science; Honorary Member of the Connecticut State Medical Society; President of the Medical

Association of the Greater City of New York; Vice-President of the Society of Medical Jurisprudence; Formerly President of the Harvard Medical Society; Formerly Vice-Chairman of the Revision Committee of the United States Pharmacopæia, etc. Third Edition, Thoroughly Revised and Enlarged. P. Blakiston's Son & Co., Philadelphia, 1911. Price, \$7.50.

In this edition the author has added forty-three sections to the previous edition of the volume. As a work on the Practice of Medicine this volume includes the medical treatment of nearly all of the diseases recognized, and under the usual classification. The etiology, the pathology, symptomatology and diagnosis are considered concisely in connection with the treatment of the subject. Treatment, in consideration of certain well-known conditions, as enteric fever, is exhaustive; in other cases the consideration is often brief. The writer manifests a familiarity with disease, the result of his long experience, and is usually concise and clear in his diction. He has given considerable attention to the employment of serums in therapeutics, and some attention to the employment of physical measures. In the latter, however, like most present-day writers, his suggestions are brief and indefinite; and sometimes, as in the treatment of neuritis, he employs measures which should to-day be obsolete, in lieu of the successful treatment of such conditions by the high potential currents. The work is very exhaustive and complete. The book is well bound and well classified, and contains a good index.

AND PHARMACOLOGY AND THERAPEUTICS; Or, the Action of Drugs in Health and Disease. By ARTHUR R. CUSHNY, M.A., M.D., F.R.S., Professor of Pharmacology in the University of London; Examiner in the Universities of London, Manchester, Oxford and Leeds; Formerly Professor of Materia Medica and Therapeutics in the University of Michigan. Fifth Edition, Thoroughly Revised. Illustrated with Sixty-one Engravings. Lea & Febiger, Philadelphia and New York, 1910.

This volume treats the subject of pharmacology and therapeutics in a very thorough and complete manner from the purely drug point of view. Very little is said concerning other methods of treatment, and the author prefaces his work by the statement that "while it is true that the more advanced practitioners of medicine have very properly abbreviated their list of remedies," he is disposed for the benefit of the student to treat the subject broadly, which he has done in giving an exhaustive consideration of the properties and therapeutics of the whole range of pharmaceutical preparations. One feature of the work which will be appreciated is the graphic tracings showing the effects of various drugs upon the pulse and respiration. The work is exhaustive, and treats each subject with thoroughness. It is a complete reference book for the student and practitioner, though too voluminous for a text-

book. The book is bound in the substantial manner and the usual good taste of the publishers.

HYDROTHERAPY: A Treatise on Hydrotherapy in General; Its Application to Special Affections; the Technic or Processes Employed, and Use of Waters Internally. By GUY HINSDALE, A.M., M.D., Lecturer on Climatology, Medico-Chirurgical College of Philadelphia. Octavo of 466 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1910. Cloth, \$3.50 net.

This volume has evidently been prepared with great care by the writer, who has confined himself closely to the subject in hand, not wishing, as he says, to disclaim the use of drugs and other methods. The work is well illustrated, giving a complete idea of the approved methods of employing hydrotherapy. The author recognizes the leading authorities who have contributed to this subject, showing a degree of research in its preparation which is commendable. The publishers' work has been done in the creditable manner characteristic of the well-known publishers. It is printed on excellent paper and well bound.

LESSONS ON THE EYE, For the Use of Undergraduate Students. By FRANK L. HENDERSON, M.D., ex-President of the St. Louis Medical Society (1905); Chairman of the Ophthalmic Section of the St. Louis Medical Society (1910); Ophthalmic Surgeon to St. Mary's Infirmary; Consulting Occulist to the Wabash Railway; Member of the American Medical Association; Member of the Missouri State Medical Association; Member of the American Academy of Ophthalmology and Oto-Laryngology, etc. Fourth Edition, Revised. P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, 1910. Price, \$1.50 net.

The writer's intention in the preparation of this work to produce a practical work for the general practitioner seems to have been ably fulfilled. The work treats the subject in a concise, clear and practical manner, and includes the consideration of the anatomy, optics, refraction, physiology, and the various disorders and derangements of the eye in a thoroughly scientific manner. The illustrations are excellent, and give a very definite and correct idea of the various structures and diseases of the eye. It is a practical work for the student or general practitioner. It is very neatly bound, and printed on an excellent quality of glazed paper.

THE TREATMENT OF SYPHILIS BY THE EHRLICH-HATA REMEDY (Dioxydiamido-Arsenobenzol). A Compilation of the Published Observations by Dr. Johannes Bresler, Chief Physician to the Provincial Medical Establishment at Lüben, Silesia. Second Edition, much enlarged, with the portraits of Ehrlich and Schaudinn. Translated by Dr. M. D. Eder, with an abstract of the most recent papers. London, Rebman Limited, 129 Shaftesbury Avenue, W.C. New York, Rebman Company, 1123 Broadway. Price, cloth, \$1.00 net.

This translation is an abstract of many recent papers published on the subject of Salvarsan (606). The work of Dr. Johannes Bresler, who has been associated with Ehrlich during his researches in quest of a remedy for syphilis. The work gives a brief history of the early uses and experiments of Ehrlich and his associates with the new remedy. In the course of the work the writers have given the various reactions and unfavorable effects which may arise in the course of its administration, which will serve a valuable purpose with those who are employing it. It is evident that there is much to be considered *pro* and *con* with reference to this remedy, as would be expected. For this reason a work of this kind is timely.

DISEASES OF THE STOMACH AND UPPER ALIMENTARY CANAL. By Anthony Bassler, M.D., Visiting Gastro-Enterologist to the People's Hospital, and Visiting Physician to the St. Mark's Hospital Clinic; Member of the Gastro-Enterological and American Medical Associations; Fellow of the New York Academy of Medicine, etc. Copiously illustrated with numerous half-tone plates (with nearly 100 figures), plain and in colors, from original photographs and drawings. Philadelphia, F. A. Davis Company, Publishers, 1910. Price, \$5.00 net.

The author of this valuable work, the result of years of research and investigation, deserves great credit for the masterly way in which he has treated the subject. He has given careful research and credit to the work of others, except where he has found the views not in accord with his own experience. The work comprises thirty-one chapters devoted to Anatomy, Physiology, and Pathology, the Chemistry of Digestion, a carefully written chapter on Methods of Examination, Physical and Chemical of the Stomach and Intestinal contents, as well as the modern use of the x-ray in diagnosis of the posture and other conditions of the stomach. These chapters give valuable information to the student and clinician. The therapeutics include the practical employment of physical measures in the treatment of these disorders, as well as the regulation of diet, and other medicinal treatment. Chapters are devoted to the treatment of all diseases of the alimentary canal, particularly of the stomach and upper alimentary tract. The work is comprehensive, concise and scientific, and a valuable addition to the literature of the subject, containing as it does many new and original suggestions, the results of the author's personal investigations. The work is profusely illustrated with very instructive plates and drawings, showing the various pathological conditions, germs, skiagraphic findings, and facilities for giving the various treatments and examinations. The publishers have done their work in a most creditable manner. It is printed on good paper and reflects credit upon both author and publishers.

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HUMANITARIANISM IN HOSPITAL AND PRIVATE PRACTICE.

A REVIEW of conditions existing in public and religious medical institutions, and often in private practice, particularly among the poor in large cities, discloses too often a want of the humanitarian spirit which should always exist between patient and physician, and patient and nurse.

There is sometimes a disposition to consider the patient as a "*case*" often by number and without reference to name or personality, and with a degree of indifference often to the personal comfort of the individual.

Human nature is of two types: the selfish money, and pleasure seeking individuals who are not prone to consider other people or their rights and comforts, and another type—humanitarian, thoughtful, kind and considerate of the welfare of the unfortunate, subordinating commercial interests and their own time to the relief of the unfortunate. The physician, nurse, hospital superintendent, and hospital attendant should always be of the latter type.

It is not difficult to understand why under the present system of training and requirement the profession is too largely made up of the sons of wealth and opportunity. The young man who enters the practice of medicine for any motive other than the service of humanity makes a mistake both for himself and the public. The same is true of the nurse who becomes a nurse with the primary object of an easy livelihood.

The young man who spends two or four years in college and then four years in a medical school, and adds to this two more years in hospital service, unless the son of wealth, suffers from the expense and loss of time to a serious degree; and the young man of moderate income, with others dependent upon him, who is more likely to belong to the humane class, can ill afford the time and expense of the full course of medical training.

Another condition which tends to disturb the youth, particularly the man of coarser sentiment, is a disposition of laymen to impose upon the medical profession—those who are able to pay for medical service attending medical clinics, hospitals, and dispensaries for the purpose of obtaining free treatment; thereby, working the medical profession. This disposition is so flagrant and evident, despite dispensary laws, that the young medical man is disposed to be hardened and to become indifferent to those worse than beggars and also if not humane and discriminating, to the worthy poor who attend these clinics. This condition of things can only be remedied by the city and humane institutions remunerating the young physicians for their services; when greater vigilance would certainly be exercised in enforcing the dispensary law.

That young medical men who have served an average of ten years of their lives in preparation for their professional services should give these services gratis to a public which is so often unappreciative serves to prejudice his mind and incidentally is apt to cause him to create a public sentiment often adverse to the medical profession.

If rumors are correct, some of our great hospitals under the auspices of religious bodies and philanthropists are disposed to literally make slaves of the young probationers and nurses, particularly the latter, who serve in these institutions.

In the business world the hours of labor are now reduced to eight or ten, and these young women are compelled to work twelve long hours, during which time they are not allowed to sit down, except at meals, while serving to relieve the sufferings of others. This tends to create in them a dislike for their work, and is certain to blunt their finer sense. If the great institutions devoted to charity are not humane and thoughtful in their treatment of those who serve them, they are inconsiderate and shortsighted in their management.

That a young medical man should serve two long years in these institutions without compensation is likewise a serious mistake. It is taking advantage of the zealous disposition of the profession to add to their knowledge and experience, which is practiced of by these institutions that they may run them at a diminished cost. Both the public and charitable institutions take advantage of this medical zeal, or the desire of the medical man to better qualify himself, and he receives no compensation. Medical boards also are disposed oftentimes to work their friends into these hospitals in a way which takes advantage of the surgeons and physicians in charge.

The disposition is everywhere to best the profession, obtaining as much as can be from them, for as little compensation as possible. The tendency is to create a reactionary feeling in both directions which is not conducive to the best interests either of the physician or patient.

Another tendency which certainly is present with the nurses and attendants in some of the hospitals is deplorable; and it is hoped that it is far from universal. The American habit of tipping is abused when proffered to hospital nurses and attendants by those who have the means to give; because for this reason poor patients who have not the money to spare are sometimes slighted. That this does happen shows a want of discipline and good management by those in authority, leaving a way open to a possibility for such injustice, creating, as it is certain to in some attendants, the habit of demanding such extra remuneration or tips if good service is to be rendered.

If the best results are to be obtained in these institutions, it is not only necessary that the medical management should be in the hands of thoroughly conscientious physicians and superintendents, but that they shall seek in every way to do justice both to the medical profession and the hospital staff. That humanitarianism should be the dominant principle, and that all jealousies and prejudices should be eliminated is necessary, the one object being the service of suffering humanity.

The public has a right to expect from the physician and his assistants humane and skillful treatment; and, on the other hand, the physician and his assistants are entitled to generosity, consideration and co-operation.

PROFESSIONAL UNREST.

I N these days when there is so much said in the medical journals concerning "medical nihilism," the "outlook for the medical profession," and the "necessity for a change of tactics," and various other expressions, referable to the relations existing between the profession and the public, there is a call for investigation of conditions which have led to such concern.

The fact that osteopaths and other irregulars have sometimes successfully combatted some of the conditions where medical skill has failed accounts for the tendency of the public to seek relief at their hands.

Physicians are too often loath to investigate the methods employed by these practitioners who obtain these results. If instead of condemning them altogether, the physician would take the pains to investigate their methods, and when found successful adopt them, instead of so generally adhering to the employment of drugs or surgery as the only means for treating disease, they might be successful in putting the irregulars out of business.

To succeed in most chronic cases it is necessary to employ means which actually induce functional activities, instead of expecting by suggestion and chemical medication to arouse to normal sluggish activities.

The employment of physical agents must be adopted by the medical profession at large and individually, or they must refer their patients to medical men who do employ them; for in no other way will the work of the osteopath and Christian Scientist be hindered. For it will always be necessary to employ some physical procedure either exercise or one of the other measures so styled, for the purpose of direct local treatment of local conditions in order to overcome the majority of affections which cripple or otherwise incapacitate the human being for a life of usefulness. In such conditions the quacks will accomplish fully as much and often more than the medical man, who relies upon drugs, placebos and suggestion.

The tendency of the public is to drift in different directions: Intelligent human beings are bound in one way or another to be relieved of pain and disability and abhor surgery except as a necessity. The physician who would succeed, and be a

credit to his profession must therefore be up and doing; for it is no longer possible to fool an educated and intelligent public.

The man who cannot give an intelligent explanation to an intelligent patient as to his disease or condition and the way in which the agents employed will accomplish the result, cannot still the inquiring mind as did the physician in olden times by telling the patient that "that is his business." A disposition or sentiment of the medical profession to ignore the importunities of the inquiring sufferer, has already had its effect. It is now time for the profession to be established on a broad, generous and scientific basis.

STANDING COMMITTEES OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

Standing Committees of the American Electro-Therapeutic Association appointed by the President, Dr. Frederic deKraft, for the ensuing year.

On Direct Continuous Current, including Electrolysis, Electro-Chemical Surgery, Ionization, and all Apparatus Connected Therewith: Dr. G. Betton Massey, Chairman, Professional Bldg., Philadelphia; Dr. Margaret A. Cleaves, Dr. Wm. D. McFee.

On Induced Currents, including Alternating and High Frequency Currents and Apparatus: Dr. Frederick M. Law, Chairman, 616 West 137th St., New York; Dr. Charles L. Clark.

On Static Currents and Apparatus: Dr. Herbert F. Pitcher, Chairman, Haverhill, Mass.; Dr. Frederick M. Law, Dr. A. H. Desloges, Dr. Arthur W. Yale.

On Phototherapy and Apparatus: Dr. Edward C. Titus, Chairman, 127 West 11th St., New York; Dr. Charles Rae Dickson, Dr. Herbert F. Pitcher.

On Radiography, Radiotherapy and Apparatus: Dr. G. E. Pfahler, Chairman, 1321 Spruce St., Philadelphia, Pa.; Dr. C. G. Johnston, Pittsburgh, Pa.

On Mechanical Vibration Therapy, Exercise Therapy, and Apparatus: Dr. Fred H. Morse, Chairman, 6 Beacon St., Boston, Mass.; Dr. Herbert McIntosh, Mr. Cecil N. Money.

On Hydrotherapy, Thermotherapy, and Apparatus: Dr. Curran Pope, Chairman, Louisville, Ky.; Dr. J. S. Yates, Dr. J. J. Kindred.

On Dietetics: Dr. Byron S. Price, Chairman, 65 Central Park West, New York; Dr. Sigismund Cohn, Dr. Frank B. Granger.

On Nomenclature and Classification of Therapeutic Physical Measures: Dr. F. A. Davis, Chairman, 645 Beacon St., Boston, Mass.

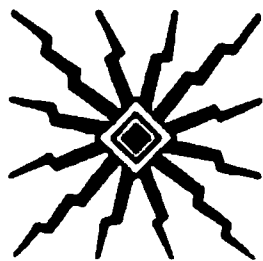
On Standard Therapeutic Measures: Dr. William Benham Snow, Chairman, 329 West 57th St., New York; Dr. Edward C. Titus, Dr. J. Willard Travell.

On Research: Dr. Frederick deKraft, (*ex-officio*) Chairman, 148 West 70th St., New York; Dr. G. Betton Massey, Dr. Frederick M. Law, Dr. Herbert F. Pitcher, Dr. Edward C. Titus, Dr. G. E. Pfahler, Dr. Fred. H. Morse, Dr. Curran Pope, Dr. Byron S. Price, Dr. F. A. Davis, Dr. William Benham Snow.

On Arrangements: Dr. G. Betton Massey, Chairman, Professional Bldg., Philadelphia, Pa.; Dr. Charles L. Clark, Dr. George E. Pfahler.

On Exhibits: Dr. J. Willard Travell, Chairman, 27 East 11th St., New York; Mr. Edwards G. Wilkinson.

The next meeting of the Association, as previously reported, will be held in Philadelphia, Pa., on Tuesday, Wednesday and Thursday, September 5th, 6th and 7th, 1911.



THE ETIOLOGY AND TREATMENT OF ECZEMA.*

BY HERBERT F. PITCHER, M.D., HAVERHILL, MASS.

"Eczema has been called the 'Key of Dermatology,' not only because it is the most frequent disease of the skin, but because he who understands its nature and treatment has learned much of the principles and therapeutics of various skin diseases."

There is still a diversity of opinion with regard to the etiology and pathology of eczema, but I will not repeat past history which is known to you all, neither do I expect to settle the disputed question, but will leave that for the discussion which is partly the object of this paper. Just why an irritant of some kind, or a cold wind, will cause eczema in one person and not in another is a question as impossible to answer as it is to tell why a dose of morphine will set one person's eyes wide open when it will close the eyes of another in quiet slumber, or why one man can assimilate perfectly a lobster salad while his neighbor will suffer from an acute indigestion or an urticaria.

Dr. Thomas Bateman, who wrote of cutaneous diseases a hundred years ago, defines eczema as "A non-contagious eruption, generally the effect of irritation, whether internally or externally applied, occasionally produced by a great variety of irritants in persons whose skin is constitutionally very irritable." I think you will agree that we have not improved very much on Thomas Bateman's definition.

First, there must be a predisposition or a special irritability of the skin; and second, an exciting influence which brings this irritability into action. Eczema is not a definite disease, neither is it a pathologic entity. It may be called a dermatitis, produced by both local and constitutional causes. Many prominent dermatologists believe it to be a parasitic disease.

We see cases of localized eczema where the general health is perfect. We also see cases where the eczema seems to be due to some gastro-intestinal derangement. The parasitic theory would receive support from the fact that the micro-organisms from both forms of eczema present the same pathogenic properties.

* Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association at Saratoga Springs, N. Y., September 14, 1910.

We know that eczema is caused by certain chemicals and drugs; by certain occupations; by the frequent use of soap and water, which render the skin less resistant by removing its fat combined with winter weather; the decomposing sweat and sebaceous matter in the deep folds of the body. The eczema around the genitals in children is caused from the decomposition of urine; also in elderly patients from diabetic urine; irritating plants such as poison ivy, sumac and primrose. (I once had a patient who suffered from severe dermatitis caused by poison ivy, for two summers in succession. Ever afterwards at a corresponding time of the year she had an attack of acute eczema.) The chafing of clothing, as from the collar or the cuffs, or the rubbing together of adjacent parts, as the inside of the thighs in stout people, are further causes. Eczema may be a sequel to some parasitic disease like scabies or ringworm which causes the patient to scratch. Cold weather, especially when combined with cold winds, checks the secretions and dries the skin, causing the chapped hands with deep fissures which are so rebellious to treatment. There is a form of eczema caused by hot weather which Hutchinson calls "summer prurigo."

A man cannot practice medicine many years without making some observations himself and drawing deductions therefrom. Undoubtedly there are cases of purely external or parasitic origin; yet my experience would incline me to believe that the majority of cases of eczema are due to some metabolic or vaso-motor disturbance, and the most prominent cause of that disturbance is over-eating.

Most cases of general eczema are accompanied or preceded by symptoms of indigestion, atony of the stomach and intestinal tract, causing constipation and intestinal fermentation. Intestinal putrefaction caused by the consumption of meat and other proteids is the cause of a large per cent. of cases. Tea and coffee as well as alcoholic and malt liquors used in immoderate quantities, are causes. What is called faulty innervation is a prominent factor. Anything which lowers the resistance of the system, causing a run-down condition, depressing the patient mentally and physically is a predisposing cause.

I have known many cases to accompany or alternate attacks of asthma. Glycosuria, gout and rheumatism are frequent

causes, or rather the auto-intoxication caused by the metabolic disturbances may be the etiological factor in any or all of those conditions.

I once had a patient who had been an asthmatic for many years, but at times his asthma would clear up as soon as an acute eczema made its appearance. At other times he would get relief from his asthma at the expense of an acute attack of inflammatory rheumatism. Once he suffered from all three diseases at one time. Eczema frequently accompanies genito-urinary troubles, and may be associated with pregnancy, lactation, and the menopause. Infantile eczema is acknowledged by most authorities to be due to auto-intoxication from the intestinal tract.

Hyperacidity accompanies most cases of eczema, while many obstinate cases defy treatment as long as indicanuria exists. I think then we may summarize the causes of eczema into the following: (a) There may be a local and a constitutional cause; (b) a predisposition to the disease, and an irritable skin.

(1) External eczema may be due to an irritant, whether mechanical or chemical, causing a dermatitis which in time becomes a chronic eczema through infection by some of the many forms of micro-organism which inhabit the epidermis.

(2) The internal or constitutional causes are mostly due to auto-intoxication and deficient metabolism, causing the vasomotor disturbance which produces this peculiar form of skin disease.

(3) It occurs in both sexes, at all ages and in all conditions of life.

(4) It is more frequent in males than females, more frequent in infancy than in adult life.

(5) It occurs in individuals with fair thin skins oftener than in those with dark thick skins.

(6) It is hereditary, but not contagious.

(7) Apparently it is a transient affection, but in reality it is acutely recurrent or chronically paroxysmal.

Treatment.—Sabourand says: "There is not a single remedy for eczema, but a thousand, which proves there is not a single good one." So we may conclude there is no *specific* treatment for eczema. The constitutional or internal treatment consists in carefully regulating the diet and correcting any

deranged condition of the system. Each patient should receive special consideration. The personal and family history, occupation, environment, habits of eating and drinking, the diet, condition of stomach, bowels and kidneys should all be carefully gone over.

Bulkley says: "Many skin lesions are simply external manifestations of some constitutional disorder, or are due to an organic or functional derangement of some internal organ, and the proper treatment of these conditions many times results in a cure of the skin disease.

The elimination of toxic principles and the selection and regulation of the diet will do very much towards placing the patient on the road to recovery. As I have already said, auto-intoxication and metabolic disturbances are the most prolific causes of eczema. Consequently we must first endeavor to correct those faults. An out-of-door life with regulated exercise, proper food and plenty of water, will cure many cases of eczema which have defied a long course of drug treatment. Dr. Geo. N. Fox says: "It is a severe reflection upon the practice of medicine of the present day, and one well worthy of thoughtful consideration, that many patients suffering from chronic eczema and psoriasis would recover sooner under the strict regimen of an athletic trainer than in the hands of a medical man whose idea of cutaneous therapeutics has never reached beyond the narrow confines of Fowler's solution and a frequent change of ointment."

I have yet to find a drug which has any special action upon the disease *per se*, consequently the internal treatment is entirely symptomatic. Arsenic has aggravated more cases than it has cured. It is said to be a direct stimulant to the epithelial structures of the skin, and yet, I have known it to be given in acute eczema. It has been the bosom friend of the general practitioner for generations and has been given indiscriminately for any and all diseases of the skin. When prescribed at all it should be useful in the chronic dry, scaly form.

Too high living and too little exercise is the cause of the majority of internal eczemas. Nitrogenized foods should be reduced, and restriction of sugar, pastries, pies and cake, and in fact all food causing intestinal fermentation; alcoholics of all kinds prohibited; also coffee and tea and the tobacco habit

regulated. Elimination by the bowels and kidneys should be practiced with large amounts of spring water. Saline cathartics and diuretics should be used when the patient is plethoric.

The external treatment of acute eczema is the treatment of acute dermatitis. This should be soothing and protective. The indications are to allay irritation and subdue inflammation, protect the surface from air, from water and all forms of irritants. Soap and water should not be used, but the parts can be cleansed with vaseline or olive oil, then apply four to six per cent. sol. of boric acid, or one-half per cent. carbolic acid in a calomine lotion. Sabourand advises superheated air in acute eczema. I have found the blue light most efficacious in weeping eczema, followed by soothing applications, like *acqua calcis* combined with a weak solution of carbolic acid and zinc oxids, or application of normal salt solution. I have found applications of hot water the very best remedy in relieving the intense pruritus which accompanies the disease. Cloths wrung out of water as hot as can be borne, and applied for fifteen to twenty minutes, will allay the intense irritation; then a soothing application can be applied which will continue the beneficial effects, and give the patient prolonged rest. Constitutional treatment with the d'Arsonval method of auto-condensation can be used every day to every other day with great benefit.

In eczema of infants and children the treatment should be directed to the gastro-intestinal disturbances. Intestinal fermentation should be corrected and the bowels kept open. In cases where itching is troublesome, a combined cap and mask can be worn which will not only prevent injury from scratching, but will keep the applications in place. Mittens can be made for the same purpose.

In nursing babies the mother's milk should be examined as to quality and quantity. The clothing and the diaper should be examined. The bathing, the soap and the towels should all be inspected, and the nurse directed what to do and what not to do. This is not only the beginning of the treatment but in many cases is sufficient for the cure of the disease. As local treatment by physical methods would be difficult of application with these little folk, I will go on with the treatment of the subacute and chronic forms in the adult. My old professor of medicine would always antedate his treatment with: "Gen-

lemen, think of your pathology." The pathological condition of the patient should be the sign-post to the treatment of this disease. As, for instance, in that intractable disease, eczema of the legs, where the venous circulation is so deficient that we get œdema we realize the first step to be taken in the cure of the skin trouble is to improve the circulation and relieve the pressure which causes the venous stasis. The legs should be kept elevated as much as possible, or a well applied bandage from the toes to the knees should be worn. We get all degrees of popular and vesicular eczemas, from small patches which may give little trouble at first, to areas which involve the whole leg. The extensive weeping surfaces become denuded of epithelium and suppuration follows. In time this is followed with thickening and induration as a result of the congestion. Ulcers may develop, usually just above the ankles; some cases go on to great hypertrophy with rough horny excrescences. In cases like these the indications for treatment are plain; the infiltration and induration must be gotten rid of; the ulcers must be stimulated, and made to heal.

The x-ray treatment will do the first—and the static brush discharge will just as surely accomplish the second. A Crook's tube with a fairly high vacuum should be used from ten to fifteen minutes three times a week to the parts affected. After each treatment the brush discharge should be applied to the ulcers until their surfaces look seared and dark. Those of you who have never used this treatment will be surprised at the rapidity with which the ulcers granulate and heal. It goes without saying that any existing cardiac or renal disease should receive appropriate treatment.

In the earlier stages of eczema of the legs with the weeping surfaces, there should be daily applications of the blue light, followed later in the disease with the x-ray treatment, using a tube with a low vacuum, being careful not to prolong the treatments and stimulate the parts unnecessarily and produce dermatitis. This is followed with proper bandaging, first applying any non-irritating preparation which good judgment may dictate, to prevent the bandage from adhering to the diseased surfaces.

Of all the tantalizing, aggravating and nerve racking ailments which human flesh is heir to, eczema of the genitals and anus takes the lead. The paroxysms of stinging, itching

and burning make it impossible for patients to keep their hands from rubbing or scratching the parts, although they know by so doing they add fuel to the fire. After the sufferer disrobes and retires for a night's rest is the time for this fiend to get in its best work. After nights of agony and days of unrest, is it any wonder that the patient's nervous system becomes deranged, and suicide is contemplated and sometimes accomplished?

This is another sign-post which points to some constitutional disorder. The patient is not a neurasthenic, soon becomes one, but this trouble usually occurs in patients with a nervous system already deranged or depressed. A thorough and systematized search must be instituted and the cause treated. Diabetes is a frequent cause of eczema of the vulva or scrotum. Excessive acidity of the urine, or the opposite condition, may exist where we get retention of urine with resulting decomposition. Indicanuria is most frequently found as abnormal fermentation, and putrefaction in the intestinal tract is an underlying cause of this disease; this same toxic or metabolic condition is the cause of other constitutional disturbances, as gout and rheumatism. The liver is disturbed in its function in trying to take care of these irritating toxins, and becomes congested, with the results of causing hemorrhoids and venous stasis of the pelvic and genital organs. In this way the peripheral circulation in this region becomes congested, with resulting irritation and inflammation. When the eczema is acute, with swelling, redness, itching and burning, the patient should be placed upon a milk diet for a few days, and the intestinal tract should be cleared with calomel followed with salines. Elimination by the kidneys should be kept up until the urine becomes normal. The hot water applications as heretofore mentioned should be applied, followed by the anti-pruritic and soothing lotions. In the vesicular form the early applications of the blue light is most efficacious.

If the disease has advanced to the chronic form with the thickened indurated surfaces, when the fissures extend into the vulva or anus, another problem confronts us. It is agreed by all general practitioners and dermatologists that this form of eczema in this locality is the most rebellious of any we have to treat. In order to lessen intestinal toxins, meats should be forbidden except in anemia, acid fruits and rich foods,

coffee, tobacco and alcohol should be prohibited. Any treatment which will stimulate metabolism should be used. Spinal vibratory stimulation with deep vibration over the liver, followed with as strong applications of the leucodescent lamp or other high power light as can be borne, over the stomach and abdomen. The wave current, or sinusoidal current over the abdomen can be used. Any leucorrheal discharge should be remedied. Anal fissures cause a continuance of the eczema and must be healed. High frequency currents with the rectal vacuum tube are most successful in curing that nagging trouble. The old method of forced dilatation under anesthesia is seldom necessary, unless the fissure is very deep, causing reflex constriction of the anus; faradization is often sufficient. The thickened and indurated surfaces of the external genital and intergluteal regions should receive stimulating x-ray treatments. A few treatments with a medium tube will sometimes relieve the intense pruritus as by magic. Care should be used not to excite too much reaction. A medium vacuum tube with five to ten minute treatments from two to three times per week is usually sufficient. Cases which have resisted every known drug application for years have cleared up in a short time under radiotherapy. Applications with the H. F. vacuum tubes are also useful.

Eczema of the hands, unless due to some local irritant, is caused by the same metabolic and toxic disturbances as the forms just described; from these same disturbances the feet are involved also. The papular and vesicular types occur in patches, or the whole dorsal surface of the hands and feet may be affected. The palms of the hands become infiltrated and furrowed. Fissures form in the fingers which interfere many times with the patient's occupation. The skin on the soles of the feet become thickened and hypertrophied like sole leather. These troubles are also most obstinate of treatment. Besides correcting errors of metabolism and giving the necessary constitutional treatment, the Roentgen rays should be used. To the dorsal surfaces of the hands and feet a low tube should be applied; five minute treatments two or three times per week is usually sufficient. Some cases can be cured in a surprisingly short time. I cured one case with four treatments which had resisted all salves and applications for three years. This was a case of papular eczema of the dorsal surfaces of

the hands and fingers; the patient had been obliged to give up her occupation. A tube with a higher vacuum should be used for the thickened hypertrophied surfaces of the feet, and treatments of longer duration given, but unless the patient can be kept quiet, any form of treatment is liable to fail.

A case of eczema of the feet.—A man 42 years of age who was a floor walker in a department store had suffered for years with eczema of the feet. The soles of the feet were very much indurated and hypertrophied and interfered with his walking. The papular and vesicular form affected the dorsal surfaces, and between the toes, causing intense irritation and itching. As the trouble had resisted all applications I began at once with radiotherapy, using a tube with medium vacuum for ten minutes three times per week until there was quite a reaction. This was applied to the soles of the feet only. I do not remember the number of treatments given, but the itching was relieved at once, and the dorsal surfaces responded after about a dozen treatments. The hypertrophied soles all peeled off leaving the bottoms not sore and raw but tender and pink like babies' feet. He kept off his feet for two or three weeks and fully recovered. Although the treatment was a little heroic, the result was all that could be wished.

Two cases of eczema of the wrists.—Two cases of the indurated thickened type of eczema of the wrists were referred to me after all kinds of washes and ointments had been used for two or three years. Both patients were robust and in perfect health. The patches were on the wrists just where the edges of the cuffs chafe. They reached across the anterior surface of the wrists and were from one to two inches wide, very much thickened and dirty in appearance with troublesome itching. In one case the patches were reflected on to the back of the wrist and hand. As both patients were hearty meat eaters, that article of diet was prohibited. An x-ray tube of medium vacuum was used for ten minutes three times per week for about three weeks, but as there was not much improvement the static brush discharge was used on each wrist for about ten minutes on alternating days. Although both cases were very rebellious they yielded to the treatment with perfect results. I doubt if the x-ray would have produced the cure without the aid of the static brush discharge.

Eczema of the face.—This affection is usually erythematous,

or papulo-trythematous, sometimes vesicular, leaving fine scales. This may also be due to gastric or intestinal indigestion. It may be due to a reflex disturbance from a uterine disease. The most obstinate type is due to some vaso-motor origin, not understood and many times incurable. In some chronic cases the skin becomes thickened and furrowed. For this type the x-ray will usually clear up the trouble if careful and persistent treatment be given.

The erythematous and vesicular variety should receive short exposure with a very low tube. In obstinate cases the ultra-violet, blue light or the high frequency current with tubes of low vacuum should be tried. Any indigestion should be corrected and the bowels kept open. Other portions of the body are treated along the same lines. While directing our efforts to eradicate the eczema, we must not forget the *eczematous patient*. We can accomplish much with physical therapeutics in the way of stimulating metabolism, aiding nutrition and eliminating toxins.

In a paper of this kind it would be impossible to lay down any specific rules; again, the pathological condition should be the sign-post along which our course of treatment should be directed. There are conditions when phototherapy and convective heat are most beneficial, or vibratory stimulation, the static wave current, the sinusoidal, continuous, and high frequency currents—all of these have their application. In arthritic eczema we can possibly get more benefit from auto-condensation than from any other method.

In treating this disease we must use great caution not to use any application which will relight a chronic into an acute form or produce an eczematous dermatitis upon a healthy surface.

In treating chronic external manifestations the x-rays stand at the head of the list. It is also the most valuable remedy for the relief of the intense pruritus which accompanies this disease. It is the last court of appeal in so many cases of the chronic form that has resisted every other method of treatment, and it seldom fails if properly used. In the subacute form and in the vesicular and seborrhœic varieties of eczema a very low tube should be used; only enough rays are needed to light up the tube with a faint greenish yellow glow; treat-

ments of from five to ten minutes two or three times per week are used.

In the chronic indurated form a medium tube should be used giving treatments from ten to fifteen minutes. We need to get the stimulating effect upon the metabolism of the skin. Where there is much induration the static brush discharge will hasten the disease to a more rapid resolution.

The effleuve from the high frequency currents or from the vacuum tubes are also beneficial in this type. Applications with a low tube will almost always relieve the itching. I used to use more than at present the continuous current, applying the ions of zinc.

In the treatment of this disease we must keep in mind the pathology of the diseased skin and the underlying conditions; to soothe when irritated and stimulate when indolent; to remember there is no disease of the skin so liable to relapses and none requiring such careful mixture of brains with remedies



THE CONSERVATIVE VALUE OF RIGHT POSTURE.

BY J. MADISON TAYLOR, A.B., M.D., PHILADELPHIA, PA.

When physicians are encouraged to act not merely as repairers, but as conservators of health, results will follow commensurate with their powers. Every person can be improved by wise direction and control. Among the most valuable measures medicine affords are those which reinforce inherent potentialities; amplify and develop latent capacities.

A curious commentary on personal freedom is a tendency to entrust bodily welfare to ignorant pretenders, untaught in fundamental principles of structure, growth and change, rather than to skilled experts, physicians, who have earned the right to guide through serious physical or other perils.

The proposition here to be presented is the conservative value of right posture; to show also how largely this factor underlies and conditions all health problems. There is ample evidence throughout scientific records to warrant the opinion that a most important key to continued health, to the enhancement of efficiency, lies in attaining right posture and maintaining elasticity of all structures concerned in motion.

The body is frequently compared to a machine, of exceptional delicacy and efficiency. Far above the resources of a machine the body possesses powers for growth, development, repair and adjustment; it is also capable of modifications by environment, favorable or unfavorable, tempting the possessor to rely upon these resources and omit exercising that care and watchfulness which would instinctively be bestowed upon an engine or a domestic animal. In consequence of this deplorable indifference to our largest obtainable asset, the body is perpetually falling into disrepair and derangement, physicians being utilized mainly to afford repairs and but little more.

The first and most obvious principle in conserving the efficiency of an engine is to make sure that all the parts are so adjusted as to secure the nicest, most exact and economic action; next, so to direct the moving forces that the parts shall be and remain in best adjustment. Then follow the manifold and diverse factors concerned in achieving the best possible development of inherent capabilities.

The normal human body is a marvel of compactness and economical adjustments. Structural symmetry contributes much to maintenance of efficiency, even to prolonging life. As a man or woman grows old, defects of bodily carriage and poise are deplored from an esthetic standpoint. Deformities caused by posture and costume impair health in many directions. Physical peculiarities, present in all to varying degrees, are too often regarded as mere matters of course, distinguishing characteristics, and dismissed as of no moment. A conspicuous stoop, a lateral twist, a sagging waist, high shoulders or hollow chest, bent knees and such-like asymmetries, are looked upon as merely questions of bad taste, or as the fingermarks of fate. They are often deliberately perpetuated, even exaggerated in portraits and frequently imitated. A grave significance is evidenced when it is realized that these departures from normal attitudes attest exaggerations of developmental faults, inducing degenerative changes in nerve centers or conduction paths; of a morbid slackness in tissues, of central defects, impaired nutrition in important structures, of compression of blood vessels and nerves, all tending to produce yet worse states in vital organs.

Too often it is wrongly assumed that such degenerative

alterations merely foreshadow advancing age and are inevitable. Changes in shape and symmetry not seldom begin in early childhood and are often obvious in adolescents or young adults, inducing much the same deformities as in older folk. Nevertheless, among some fortunate persons of great age they are practically absent. These exceptional individuals are usually possessed of marked vigor or stamina.

The foregoing facts tend to make clear that this apparently insignificant matter of correct posture warrants close scrutiny and scientific explanation. It may be urged that certain individuals are met of advancing years, or even great age, in whom attitude deformities, or worse ones produced by disease, are well marked and yet excellent physical and mental health is enjoyed. Such instances are distinctly rare and noticeable chiefly by contrast. Young folks are also occasionally encountered of awkward shape and slouching carriage who yet excel in some active field sports, showing also excellent physical capabilities. These are rare and oftentimes the attitude peculiarities are merely affectations varying with fashions and are to be explained by the following of curious and unnatural standards.

Admitting that a goodly array of instances can be cited of young or old persons graphically defective in those features ordinarily regarded as essentials to efficiency, who moreover can use their co-ordinative powers excellently well, undoubtedly they would be better for correction. If these persons had possessed full accurate command of their motor machinery and been trained to act in accordance with best standards, they would have become vastly better animals. Let us use as a familiar instance the race-horse to show why special care and training is required to produce the highest result. A thoroughbred colt, although the product of generations of selective care in breeding and training, to run or trot to the uttermost of speed and style, yet requires months and years of laborious special exercises to reach his individual maximum.

To make plain why faulty postures should be productive of hurtful conditions it is necessary to recall that *the machinery of organic life is dependent for fullest efficiency upon normal relationships of component parts one to another*. A moderate familiarity with the outlines of physiology will make it plain that one set of tissues should bear normal and exact relation-

ships to others. It is difficult to realize how the human organism can continue to live and enjoy even moderate vigor if the divinely ordered mechanisms are thrown markedly out of adjustment, mechanically or chemically, even more so if structurally changed by compression leading to disease. Yet the power of human endurance and recuperation is incalculable. None the less, a little thing may go wrong, or a totally unforeseen exigency arise, and the breath of life departs in an instant. All the more reason why every effort should be made to give nature full opportunity to work on unhindered lines, and reach relative perfection.

Let me cite a few illustrative instances to show the hurtfulness of faulty posture. The attitude of children in schools is receiving a late but well merited attention nowadays. The position of the chair and desk, if correct, saves the organs of sense, such as the eye. If it be faulty the eye is caused to suffer rapid changes, many of which become irreparable. The damage lies not so much in the mere nearness, remoteness or angle of the object seen, the character of the text, the position of the light, etc., but organic integrity is influenced even more by the cramped position of the little bodies causing interferences in the blood supply to the eye by long maintained irregular pressures on the blood vessels and nerves, thus altering the nutrition of this most delicate organ and interfering with not only function but full development. It should be recognized that long maintained sitting at desk, even in the most correct postures obtainable, produces much damage in growing structures, the thorax, the bones and ligaments, the back and limbs. Following upon this is a series of changes in the circulatory organs by which the brain and governing centers are injured more or less. The fact is well established that children put at school early and compelled to do work in advance of their years fail to acquire so complete a mental development as those who begin their studies later, when better equipped structurally by specialization through spontaneous activities and unhindered observation and adaptation. Take a casual view of a lot of school children who have not been taught or encouraged in a good system of free exercises and it will be patent that already they have begun to acquire posture deformities. This is rather more obvious in girls than boys, especially older ones, because boys follow their

instincts to enjoy free activities and self-developmental measures, such as robust games. Observe a group of adolescents, youths at college, girls on the verge of womanhood. The critical but unskilled eye will note many faults of poise, of gait, of position of head, back, limbs, etc., and the trained eye can point out, (especially if permitted to remove the concealing clothes,) serious defects hitherto unnoted. Some of these may be modified by different and improved methods of life. The lateral spinal curves often disappear under favorable conditions. Far more often, however, they become fixtures. The moderately distorting effects of school confinements are much more obvious when emphasized by certain laborious occupations.

Let us review the desirable features: A straight back is a good index of physical efficiency. By this is meant a backbone with no lateral and little more antero-posterior (front and back) curving than is normal in a child of ten years. This observation is plain enough and will be appreciated in certain of its applications, notably the military attitude, which has been taught (in better or worse fashion) since the earliest recorded times. Other things being equal, the straight, well set up back is to be found in those subjected to careful training in wholesome, symmetrical activities. In proportion as persons habitually maintain this attitude do they retain their vigor, elasticity, and correct poise.

Next to straightness of the back it is desirable to preserve elasticity and tone in trunk muscles and ligaments. Next in importance is the (nearly) horizontal position of the pelvis. Next the carriage of the neck and the superimposed head. The whole, in brief, constitutes the normal well poised attitude essential to health, vigor and full activity. Let us examine into the effects produced, or rather maintained, by a nearly straight back. If the backbone is nearly vertical the ribs must become more or less horizontal; hence they open up fan-like, and the thorax is thus made more capacious. This can be demonstrated by anyone standing back to a wall and striving to obliterate the lumbar and cervical curves, *i.e.*, to flatten the back.

These significant facts and principles were pointed out to me twenty-five years ago by a physical trainer, Edwin Checkly, and so far as I know their true value was first emphasized

by him. I have taught them ever since. It is unnecessary here to dilate upon the significance of educational measures which increase mobility and amplitude in the thorax, that chamber in which the heart and lungs are contained.

By obliterating as nearly as possible the lumbar curve the pelvis becomes almost level. The values of this are manifold. The abdominal viscera are better held in place, the strain upon the encompassing muscular wall is less and the great organs are held more firmly in their normal inter-relationships. When the pelvis tilts downward in front the position of the great trochanters (thigh-bones) is altered and their action cramped. In the act of walking, if this level is maintained, as the body leans to one side to raise the opposite leg it will readily swing free of the ground and fall naturally and easily into its next position for advance. As the body then leans to the other side the opposite leg will again swing forward with no effort, and thus plantigrade progression becomes an easy action and one can walk on and on with small fatigue almost indefinitely. Thus does correct posture contribute to speed, endurance, to nimbleness and accuracy of "leg work."

The above sketch should suffice to make plain the importance of the principles involved. One word now upon a collateral principle.

It is not possible to secure and maintain the normal erect posture and the manifold modifications inevitable in active life unless the skeletal structures be, and remain, normally elastic. I advanced these views and set forth the arguments long ago (1904) in an article in *Popular Science Monthly* on, "The Conservation of Energy in Those of Advancing Years." The distinguished English physician, Sir Herman Weber, an authority on the subject, wrote me that he was of the opinion that I had touched upon the one vital principle, *i.e.*, the paramount value of elasticity of structure in preserving youthful activities.

THE VALUE OF PHYSIO-THERAPEUTIC METHODS
IN POST-OPERATIVE AND CHRONIC CASES.*

BY RICHARD J. THOMPSON, M.D., FALL RIVER, MASS.

In any article which has for its object placing before the profession the value of remedies that are new or are not strictly medicinal, there is apparently needed, even at the present day, either an apology or a defence.

When my attention was first called to electrical methods some nineteen years ago there had been, even at that time, much painstaking work, both investigative and clinical, carried on by men whose names are on the honor-roll of our profession; men who had, by electrical or other physical therapeutic methods given *their* patients, and patients referred to them by other physicians, relief from long continued pain; pain that made efficient work either manual or mental an impossibility, and life a torture; relief, that bound those patients to them by unbreakable ties, and made the physicians who had referred them profoundly confident of the value of those methods.

If you except the diagnostic use of electricity in nervous diseases, and its use in the removal of superfluous hair, every other method was considered by ninety-nine out of every hundred of the profession of twenty-five years ago, as either utterly valueless, or, at most, of slight value and for its psychic effect alone. If you except the diagnostic use of electricity in nervous diseases and its use in the removal of superfluous hair, and the use of it in x-ray diagnosis, the same statement holds true to-day. The bulk of the profession either absolutely ignores work of this kind or denounces it as quackish. Worse than this, the men who should be the leaders, the faculties of the medical colleges, will not investigate, with a view to teaching in the schools, any subject in applied medical physio-therapeutics, except those mentioned above.

I think you will readily acknowledge that there exists, and physicians come into contact with a large number of cases, that, as a result of injury, or following operations, or left unrelieved by operations, or left subsequent to operative procedures but not as a result of them, are inconvenienced more or

*Read before the New England Association for Physical Therapeutics.

less, or suffer pain greater or less, or are uncomfortable in body and mind, or rendered incapable of supporting themselves.

That these cases with their permanent conditions of semi-invalidism are a stigma upon our profession you will also admit.

In a ceaseless round of journeying, seeking someone who may render them self-supporting, or free them from pain, this increasingly large number of sufferers, tired and discouraged, hold outstretched hands to a profession who says to them, "No hope," and dissuades them from seeking help in lines outside channels they recognize.

Powerless to greatly aid, resourceless, the bulk of the profession leaves these poor wretches to eat out their souls in an agony of helpless despair, while they endeavor by keeping quiet to decrease their pain or resort in a dull rage against fate to morphia.

Physicians are apt to complain of a class of natural bone setters, so-called, or of osteopaths and scout their reputed cures. Most of these cures are the result of slow, persistent, calculating or intelligent, although probably not scientific, manipulation that any careful physician could duplicate if he were *willing* to take the time to do this mechanical work.

These men are kept busy with patients who seek them because the members of the regular profession have given them medicines and directed them, but would "not so much as move them with one of their fingers."

Now, in a majority of these cases relief, temporary or constant, measurable or absolute, can be given by physio-therapeutic methods and a very large number of these patients, whom pain or disability has taken from work, can be rendered self-supporting again.

And to a few illustrative cases I would call the attention of any who doubt the value of physio-therapeutic methods in chronic and post-operative work.

It is distinctly premised and should be understood that physio-therapeutic methods imply any methods that use in whole or in part agents other than drugs.

Case I. Alex. M., age 31. Scotch, married. Always well. Uses tobacco and liquor moderately. In June, 1898, he fell from a staging which was overturned by the fall of a derrick,

the guy ropes of which had broken, and on which at a height of forty-five feet he was laying brick. He landed on his feet on a pile of brick. He was carried to the hospital in the city where he was working and was under the care of competent men. He was told that both ankles were broken. He was sent home to Fall River at the end of six months and was told that nothing more could be done for him, that he would be permanently crippled as he then was.

His wife came to me Nov. 20, 1899, to ask if anything could possibly be done for him. He had tried to go into the mill to tend a machine that did not require moving, only standing, but it was too painful for him to continue. All that was left to him was to peddle pencils in the small neighborhood about his home, hobbling from place to place on the street, unable to go up steps, because of inability to bend the feet and from pain in the right one. His gait was as I show you—a shuffle.

Day after day he would come home and cry from the pain and the humiliation of his occupation. He had wished himself dead, and I suspect he would sometimes have done more than wish himself dead had his condition continued. He by great effort got to my office on Nov. 23, 1899.

All the toes of the right foot were contracted except the larger toe, which was free. He was unable to move either foot, and all motion in either foot was but slight under manipulation, and elicited pain that persisted afterwards. It pained him to walk or stand, the pain being located in the feet and ankles and continued after he had been seated and had rested. He had pain at times when he was sitting still for days. His general condition was good, with the pulse and temperature normal.

He was given treatment on this date with the Betz hot air apparatus to both feet at 250° F. for one hour with manipulation subsequently. This was not carried sufficiently far to cause pain, yet his ease of motion without pain was very evident to him. At his next visit, on Nov. 27, after four days interval, the treatment was the same, with marked gain in motion. On the next day the treatment was the same. He walked out of my office with markedly different motion and with no pain. On Dec. 1 he reported that he has had no pain and can go upstairs without great difficulty. On Dec. 4 the treatment was the same, and was followed by very great

freedom of motion under manipulation. On Dec. 6 the treatment was given, after which there was no pain and he walked easily. He was told to report in one week, but had not come in at the end of two weeks; so I sought him at his home. He said, "I can walk fine, and I didn't need to come in. I have a job in the mill as there is not any mason's work in the winter." He had no further treatment and no medicine was given other than salines to keep the bowels free. He is at this date well, and has been for eight years, and at his old work of bricklaying. He is rarely in discomfort, and never in pain. He is occasionally a little stiff in the coldest weather if he is not working. For a case that had been condemned to a life of uselessness and was fast getting there, it is remarkable to be made self-supporting by six treatments running through fourteen days.

Case No. 2. Elizabeth A. M. age 44. Unmarried. English. Weaver. Saw me first on Nov. 2, 1905, giving the history that she had always been well until a year and a half before, when she broke her leg at the lower third near the ankle. Her case was in the care of a very competent man. When she began to get about she was lame and the lameness increased, with stiffness following, and then pain, until at the end of six months she could only hobble around, making it impossible to do any work. During the following year she could do nothing, but with starvation staring her in the face, she tried to go out to do cooking, two days of which so aggravated her pain that she could not bear to move and was in acute suffering. Two days after this I began to treat the foot which was red, swollen and with almost entirely restricted motion. On account of pain and underfeeding her general condition was poor, while she was also anæmic from a year of indoors. Without going in detail into the treatment, or noting the gradual improvement in the case, let me say that she had treatment from Nov. 2, 1905, to May 26, 1906—six months and twenty-four days. During the first two months there were thirty-seven treatments with varying degrees of hot air followed by manipulation and no other method during this time, with prompt relief of pain, and increasing ability to use the foot. During the next three months there were thirteen combined local vibration treatments to the leg and general vibratory stimulation. And also during the

same three months eight separate local vibration treatments to the leg. On April 7, 1906, I find on my card record this entry: Can walk without pain and is working in the mill at speeder—tending because not able to obtain her old job at weaving.

She had also four applications of the high frequency vacuum electrode from a Tesla coil. To-day she is working and it is only under unusual and prolonged standing still that she had anything more than tiredness in the foot. I do not think her slight limp can be detected. Indeed the well leg and foot which for more than a year and a half had done all the work, and itself required for the first month some treatment, is the more susceptible of the two.

While this was a case requiring long time and frequent attention, still the fact of having put the patient figuratively and literally on her feet after a year and a half of invalidism, should disarm criticism.

Case 3. C. M. W., age 38, unmarried, American. School teacher. She came to me from a neighboring city on Dec. 20, 1905, giving a history of a fall on the school stairway on Oct. 11, 1905, in which the right knee was struck and the weight of the body came on to the doubled knee. This was immediately followed by ecchymosis and great swelling, but she kept about and went on the cars to school some eight miles each day for two weeks despite the pain, which was, under motion, very considerable. The knee was given hot fomentations each night. She was then sent to bed for four days and fomentations with witch hazel were ordered by her physician with improvement. She then went out again, and for two weeks it improved. Then another rest of four days, then out again and improved for a few days and then began to hurt greatly and to swell under use, became sore to touch and any pressure on the bones in the region of the knee caused pain. Greatly swollen and skin glazed and reddened over patella and above, and could not bend knee. No walking or motion was possible without severe pain and has persistent aching at night. Her temperature was 99° F. and pulse 96. She was of full habit, with the bowels tending to constipation, and of a very nervous temperament. These were the conditions at the time of my first inspection. She was immediately given the hot air at 260 ° F. at first morning and night, varying from 45 to 60 minutes, and during the following seventeen

days she had twenty-eight treatments the last being on Jan. 10, 1906. The pain and soreness were then greatly mitigated and the swelling gone, and the knee could be bent, when nothing more was expected from this method. The knee however was weak, could not be depended upon, frequently giving out under her, and feeling a great sense of pressure owing in some measure to her weight. She had twenty-five local vibratory treatments to knee and twenty combined local vibration and vibratory-stimulation treatments and four high frequency vacuum electrode treatments, all covering a period of five months and five days, at which time she could use the knee in all required ways. If she walked a long distance it would feel tired. On July 30, 1907, she came to me with nervous prostration, a result of family illness and overwork. The knee at that time was one-fourth inch larger in circumference than the well one, and in long continued attendance upon a sick mother, in addition to school work, had given her no trouble. At this date, Dec., 1909, she takes long walks over poor roads and would not know she had ever had trouble with the knee.

This patient came to me because the physician had told her that her knee would always trouble her and she must stop the use of it for months. After I had gotten the pain out of it, she went on with her school teaching. Certainly at the time I first saw her it was one of the cases that are left to "nature and quiet," and end by restricted motion and lameness, and by aching and pain upon prolonged use.

Case 4. Alice R., age 34. Weaver, English. Thin, anæmic, weight 96 pounds, a loss of fifteen and one-half ounces from previous weight. She came to my office on Oct. 7, 1905. She had grippe in May of the same year, but had always been delicate and had had many illnesses. She was ill with grippe for two weeks and then went to work, which she had to stop because of sore feet, which gradually were increasingly worse with aching pain. She had some pain in the feet six years ago which went away after a short time. She had had an occasional time when the use went out of the arms and legs and tongue. For the last five months she had spent her time and substance in faithfully trying to get relief from the ache in the feet, as her wages were necessary for an aged mother's support. She has had medicines, and appliances, which increased

the pain, and directions for rubbing and bathing. Examination shows the whole body under-developed muscularly. The body is drawn to one side, there has evidently been an old pleurisy with empyema with spontaneous opening, as the mother says she was never cut but had an abscess. This was confirmed by auscultation. There was no difference in the appearance of the legs. The patellar reflexes were lessened. There was marked tenderness of the lumbar spine. This patient was given forty-six treatments, which were combined vibratory stimulation and local vibration to the feet and legs. The response was very slow and she tried many times when improving to go into the mill to work but was obliged to come out on account of the pain in the feet. On January 4, 1906, she had a seizure in which she lost the use of the right arm and the right side of the head and the tongue was numb. This passed away that day. On Jan. 8 she walked to and from my office, a distance of one and three-quarters miles, each way, and said she didn't feel badly from the walk. The following day she went back to the mill and worked for a week and the record says: "Is not feeling badly now even when she is on the feet all day. She notices pain however if the feet get cold." Feb. 24, she has been a week without noticing that she has feet. On March 31st she was working steadily, and in no pain. I saw her about two years ago and she is still well.

This case might have gotten back to work without medicine or treatment, but I very much doubt it.

Case 5. Georgiana B., age 44. Unmarried. American. Occupation housework. She was first seen July 9, 1907, when she was complaining of pain and pressure in the back at the waist line, the pain running into the right hip. She is a very nervous woman. She had been operated upon because of intense throbbing pain in the back, for removal of the ovary and appendix. This was one and one-half years ago. It was three months before she got up and about, and a year before she could work again. After the operation her back always ached. She had been constantly since the operation under the care of the very competent surgeon who did the operation. She had improved in flesh and strength, but the constant pain he was unable to remove, and finally in disgust or desperation he said to her: "You go and see Dr. Thompson. He uses electricity. It's just possible he may be able to help your back."

There was found to be great sensitiveness in the lumbar spine and adjacent soft tissues. Extremely light vibration was at first used over the regions with a soft rubber cup, and this was gradually increased in length of time and in force. She saw me four times from July 9 to 30, at which time she said her pain was absolutely gone. On August 16 she consulted me for a coryza and there had been no recurrence of the backache, and her employer told me on Oct. 3, 1909, that she is not complaining of any backache. This case is illustrative of that very common class of cases where operations for the removal of tubes or ovaries are done, and in which pains in the back, or burning pain in the abdomen or both, are expected to be relieved by the operation. In many cases relief follows at once or within a reasonably longer period. But there are a large number in which the pain habit remains and it is in these cases that physio-therapeutic methods post-operatively will give relief.

A friend of mine has just returned from a trip of observation and study in the West. He was walking through a great hospital with one of the greatest surgeons of one of the largest cities, one whose name is to-day on the lips of the surgical world. A patient came hastening to him to say: "Oh! Doctor! I want to tell you again about this pain which I have in my bowels since the operation."

"My dear woman," said the famous surgeon with his most impressive manner, "that pain is *not* in your abdomen; it is in your *mind*."

And that surgeon will have his assistants working on that patient's *mind* for months or years and may succeed, but in most cases fail to rid her of her pain until nature's recuperative tendencies and time, secure and maintain physiologic balance. While if he were to patiently and persistently for *half* the time, and it is marvellous sometimes how quickly they yield to treatment; if, I say, he were for half the time to honestly use high frequency or vibration, or light, or any other well-selected modality he would find nutrition and excretion and repair so influenced, and pain so controlled that he would be, to say the least, astonished.

Even we who are in this work have not begun I think to appreciate the possibilities in this line of our work.

As the well-read surgeon extirpates all he can of the cancer

and then sends his patient to the x-ray man for treatment, so will the surgeon send his patient to the physio-therapist and shorten a tedious convalescence and abate its accompanying pain.

I believe there is to-day too much of the feeling in the profession that illness or pain is all in the patient's mind, and I feel that too frequently there is an undiscovered condition which has been credited to the patient's notion.

While exact diagnosis may be difficult or next to impossible in many of our cases, clinical observation and a tentative resort to measures that will not damage will often put one in the way to give wonderful relief to conditions that have been exasperatingly obstinate to us, and entirely baffling to the man who has not learned to look to physio-therapy for help.

If, gentlemen, I shall have made you appreciate the value to humanity of the work you have been so unobtrusively doing for years, and shall have made it clear to the doubter that there is a broad field for the use of physio-therapeutic methods in the hands of men who are willing to take the necessary time to use them patiently and carefully and honestly over long periods, then the object of this paper will have been accomplished.

531 High Street.

Discussion.

Dr. Peckham, Providence. There is a lot of meat in this paper but I don't know as I am able to discuss it, but there are some things that will appeal to all of us, no matter what line of work we are doing.

The Doctor did not dwell on his diagnosis of the case, but told us the symptoms. It seems to me there are some cases where massage and manipulation are very useful but in some cases no matter what we do, there seems to be no permanent relief.

It is important to examine the spine and make the physical examination carefully and accurately and the more this is done the better will be the results. We should find the spinal irregularities and we all know that we are getting better results than we did a few years ago.

In the case of fractures which the Doctor spoke of I see many cases where in a previous treatment there has been faulty reductions and faulty union. I have treated these cases as the Doctor has outlined.

As to physio-therapeutics as applied to backs: I heard an intensely interesting paper last June by an eminent gynecologist who said that oftentimes the symptoms would remain after

the removal of the organs. He urged the use of these measures first and then operate last instead of first, if necessary.

Then there is another idea which the Doctor spoke of—about its being all in the patient's mind. I think that is an extremely interesting point. We have all seen cases where no matter what we do, the patient did not get better, and we thought it was in the mind. I firmly believe that as time goes by and finer and finer searches are made for the pathological condition, we can find the cause of the pain. If a patient has a pain, it is real. To say it is in the mind is like Christian Science, and that does not go, outside of Boston. You can't give these people a dose of Christian Science at night and expect them to have an Emmanuel movement in the morning, and get well. I am firmly impressed every year that the harder we look for the real pathological condition the more surely we will find it, and then the treatment can be more intelligently applied. I enjoyed the Doctor's paper very much.

Dr. Goodell. On Jan. 16, 1902, a meat cutter, with a septic hand which was scratched on a pork barrel, came to me. His hand was hot, painful, and swollen. I gave him one treatment in the small dry hot air apparatus, at 450 degrees Fahr. The swelling was reduced, the abscess discharged freely, and the pain was relieved so that he slept well that night, which he had not done for several nights. I feel that without this treatment he might have had some contraction of the tendons, as it was, the hand healed quite rapidly after the treatment.

A few years ago, on the evening of July 3, a lady, on her way to the Salem bonfire, had a severe cramp in her epigastrium (a condition that she had been subject to for some time) and stopped at a neighboring physician's office for a hypodermic of morphia. He was not in and she came to me. I used simply the high power light on the abdomen, clothes removed, and waited. In ten minutes she was not much better, but in fifteen minutes the pain was entirely relieved. She told me that it was the first time the pain had been relieved without an opiate.

These two illustrative cases show the advantage of physiotherapeutics over the treatment by drugs alone or the expectant treatment.

Dr. Gray. My work for the last eighteen years has been mostly surgery, and during that time surgery has not stood still. There are a great many of these cases at the present time that deserves just such treatment as the Doctor has detailed here to-night, and I have been able to recall case after case, during the reading of the paper and the discussion, in which physical measures have brought relief to the patient after surgery has failed to give it. I am not convinced that the application of our methods in these cases, as they were when they came to the surgeon's hands would have afforded

the relief that has been spoken of here to-night, but it goes without saying that where damage has been done, repair must take place. If the surgeon is dealing with infections, be they acute or chronic,—if he has removed the infected part, that focus must heal, and in many cases the focus has got to be treated in order to enable it to heal. There sometimes follows stiffness of the joints, and nervous troubles, and all that sort of thing, and it could be helped. In the case of the removal of an ovary, I think as a rule there are some adhesions left as the result, and they give pain and discomfort. When the patient has been removed beyond the pale of danger and has been put into a condition where these methods can be safely applied, they do a vast amount of good, as you know.

I remember a patient, a woman, who had an infected wound of the hand. It went on from bad to worse until the whole forearm was involved. The surgeon opened up the arm. After the acute infectious process was over, there was but little motion in the fingers, or wrist, and she suffered a great deal of pain and the sinuses wouldn't heal. This happened while I was in Europe. The woman had previously been a patient of mine, and the first part of the surgery was done by another man. When I got back home she came to me, and I put a tourniquet on her arm above the elbow to induce capillary congestion, and to my mind the way healing went on in that arm was something worth seeing. I always had a pretty good opinion of electro-mechanical work. Having a vibrator and one or two other pieces of apparatus I stimulated the arm with the static brush discharge and gave her light vibration, and I could see improvement each week. Now, that woman had the patience to come to my office for a period of about nine months. She got so well that she could sew with that hand and it did not cause her pain. Her fingers are not as flexible as they were before, still she gets along and does her housework.

Dr. Thompson in closing said: I want to thank you for the kindness with which you have treated me. I appreciate the criticism which Dr. Peckham made in regard to the diagnosis question. Dr. Peckham will bear me out in this: that in cases of all sorts in the lines in which we usually administer this type of treatment, we are always open to the symptomatic treatment in our mind if not in our will. I want to state that in case No. 4 of that girl with the pain in her feet, I made no diagnosis. I confess that I pay attention to the symptoms that confront me first of all, because I go at a case in an entirely different way from the way the surgeons approach it. The surgeon to-day is getting a good way from the position which he took five or ten years ago, that while the doctor was studying the case, no matter what a patient suffered, he must

grin and bear it. These cases come for relief, and they will get it if we treat the symptoms.

This paper is by no means a scientific paper. I don't need to tell you that. I feel most positively that the cases that came to me years ago might have been helped in that particular way. In cases where there was a continuing pain in the back, or burning, I think something might have been done for them. I ought to have changed the subject of the paper to "A Plea for the Use of Physio-therapeutics." I have in mind instances not so positively certain in their results and yet positive for cases that were acute. I want to cite the case of a woman who came into my office and said she had stood the pain as long as she could, and wanted to get some morphine or something to cure her pain. She had from exposure a condition of the muscles of the neck in which it was impossible for her to move her head. She said she would go to sleep and if a noise awakened her and she turned her head, she was in agony. Just two days previous to this I had the Hercules machine installed in my office, and I was getting very high frequency from this machine. I told her that I could make her feel better, and that I thought I could send her away feeling comfortable, but that she would have to come back again the next day or within a few days. I used the vacuum electrode on her neck, followed by delicate vibration through the neck and the region of the shoulder. She said the pain was gone and she felt better. As she went out I said to her: "I want you to come back to-morrow if you are not feeling entirely comfortable (and I don't think you will be) and anyway, come back Wednesday." As I spoke to her, she turned her head and she looked at me with amazement and said: "I have not turned my head before without pain for four weeks." I did not hear from her on the next night, nor the next. I telephoned her at the end of five days and said: "You have not been in to see me," and she said she had had no trouble since she was at my office. What would you have done with this case a few years ago? You would have given her morphine. She had gotten to the point where she must have something. That was the end of that trouble.

A good many times a patient will go to the surgeon, and the surgeon says the ovary is enlarged and he will remove it. I firmly believe that if the patient would come to us every day, in a lot of these cases the patient would get gradual but positive relief, and if they would only continue to come and follow directions they would be cured. The idea of an operation, however, appeals to a woman as getting something for her money.

Progress in Physical Therapeutics.

GYNECOLOGY AND ELECTRO-CHEMICAL SURGERY.

EDITED BY G. BETTON MASSEY, M.D.

Thermocautery in Carcinoma of the Cervix.

Carlton C. Frederick has a most interesting, instructive and soberly worded paper on this subject in the *Journal of the American Medical Association* for Jan. 14, 1911, the paper having been read before the Association at the St. Louis meeting. We quote in part:

"Hysterectomy for carcinoma of the cervix has been a more or less unsatisfactory operation, the large percentage of early recurrences being an especially distressing feature of its results. . . . Operations which do not remove all the diseased tissue only hasten the process of growth, as witnessed by the reported rapid recurrences in so large a percentage of cases. Many of these patients would live longer if they were never operated on. Another fruitful source of recurrence has probably been infection of raw surfaces at time of operation, as evidenced in the prompt recurrence in the scar in the vaginal vault. The scar would not be the first point of return were it not for this fact.

"The late Dr. John Byrne of New York nearly twenty years ago demonstrated what he could do with the actual cautery in inoperable cases of carcinoma of the cervix. He reported a series of successful operations by the method of which he was the author, which to this day excels in results any that have been done by any other operator. He wrote of his method and reported his results from time to time till his death, but for some unknown reason his methods were never persistently followed by any of the army of operators who knew what he was doing. Dr. Byrne, in a discussion of one of Dr. Boldt's papers on carcinoma, made this statement relative to the apathy of the profession as to the cautery operation:

" 'That the great bulk of our profession have practically ignored one of the least dangerous, but most successful of all the means yet devised for the relief and often permanent cure of uterine cancer is something *not* to be proud of in this age of progress.'

"His report made in 1896 as president of the American Gynecological Society embraced two series of cases, one con-

sisting of 63 patients operated on for cancer of the portio vaginalis, of whom 23 patients had strayed away, leaving only 40 to account for. Of these, 'exemptions from relapse were obtained ranging from two to twenty-two years, averaging nine years for each.'

"In the second series of 81 cases, out of which 31 patients had strayed, he reported exemption from relapse as follows: 10 for over two years; 11 for over three years; 6 over four years; 8 over five years; 6 over seven; 2 over eleven; 1 over thirteen and 1 over seventeen years. He further reported one of his stray patients, a very unpromising one when operated on in 1875, recovered and was alive and well twenty-one years afterward.

"Undoubtedly a goodly proportion of the patients subjected to hysterectomy in the past would have been as well, and probably better off without operation, and would have lived longer. It is manifestly our duty not to operate when the results of such operations are known not to relieve, but probably hasten the death of the patient. But we cannot desert these poor sufferers. And in the cautery operation of Dr. Byrne we have the means of doing for them that which cannot be done in any other way. All the other makeshifts, the chemical caustics, such as zinc chlorid, pyoktanin, bromin, etc., are useless as compared to the galvanocautery, because they are difficult to control and of doubtful efficacy.

"The galvanocautery can be controlled, and all done while the patient is under the anesthetic. When the cautery is withdrawn we are sure that no further destruction of tissues is going on. With the chemical caustics such is not the case. Besides, the cautery is more penetrating and certain in its results.

"The acetone treatment, to which Dr. Gellhorn of St. Louis first called attention by his publication in *The Journal* of this Association in 1907, and later in the *American Journal of Obstetrics and Gynecology*, I have never tried. I have often tried out the cautery in this class of cases. Acetone is not to be classed with bromin, zinc chlorid, etc., because it is not a caustic and is followed by no sloughing. It is more of a hardening fluid; but from all reports I doubt that its depth of penetration is equal to that of the cautery. One of the strongest points in favor of the cautery is that scar tissue follows its use, and as scar tissue always is contracting, it to a greater or less extent interferes with the nutrition of the cancer growth and thereby prevents recurrence or inhibits rapid recurrence and growth.

"When the carcinomatous growth has progressed to the stage of breaking down with hemorrhage and infection, we have not only the results of the hemorrhage on the general health of the patient, but we also have various grades of

toxæmia from the infective processes accompanying the sloughing and bleeding cancer tissue. Both the hemorrhages and the infection may be stopped by the thorough use of the cautery, thereby controlling two of the prominent inroads on the health and life of the patient. And if in addition thereto we take into consideration the cessation of foul, fetid discharges, which are disgusting to the patient and all about her, we have added no inconsiderable blessing to her existence. By this means if we do not permanently cure the patient, we are adding to her length of days as well as making her life more happy and tolerable.

"Manifestly cauterization of a fungating cervix will not cure the patient if the infection has passed up into the pelvic lymphatics beyond the reach of the cautery. But in a small portion of cases, even far advanced, infection of the lymphatics higher up has not occurred, or else Dr. Byrne could not have had patients alive five to twenty years after cauterization with no evidence of any carcinoma present. Undoubtedly many of his successes were in cases which were seen comparatively early in the disease, and as he treated all patients with cancer of the cervix with the cautery, instead of hysterectomy, his results would naturally give a larger percentage of cures than are obtained by treating the inoperable cases only, by this method. Cases which we consider safely operable are seldom if ever treated in this way, but the radical operation is done probably with as great or better chances of non-recurrence, with a proper technic, to prevent reinfection at time of operation.

"The sharp curette is the adjuvant of the cautery in the inoperable class. By it the soft bleeding mass may be removed, thus excavating down to the basement carcinoma. All of the cylindrical water-cooled speculums which have been devised, to my way of thinking, are hindrances rather than helps to the efficient performance of this operation, because by their thickness they so limit the field of operation and vision that I, at least, cannot do it thoroughly. Burning of the vagina or bladder may be prevented by placing over the blades of speculums and retractors moist gauze jackets made to fit them. By this means a wide field of vision and action is obtained. After curetting away all the soft tissues, there is more or less cozing and sometimes bleeding.

"Dr. Boldt, several years ago, suggested, and I think practiced, packing the crater thus made and waiting a day or two before using the cautery. If there is too free bleeding which cannot be readily controlled, this is a good plan to follow, for the effective use of the cautery demands a comparatively dry surface; otherwise the penetration of heat from the cautery tip will not be sufficient. Dr. Byrne used a saturated solution of zinc acetate with 25 per cent. of strong acetic

acid to stop oozing and to dry the curetted surfaces before using the cautery. The acetone, from Dr. Gellhorn's report, will also prove to be an ideal application to stop all oozing.

"I think that many operators have failed to get results and have given up the attempt to do this operation because they have not used a good and efficient cautery. No Paquellin thermocautery apparatus that I have ever seen can do the work properly. Only the right kind of electrothermocautery will do work efficiently. Ordinary cautery batteries are of doubtful utility. The ordinary street current used for incandescent electric lighting, controlled by a rheostat, gives the necessary power to heat a platinum dome to any degree desired from dull red to white heat. Before using the dome the operator should determine where he desires the most penetration, where the tissues are thickest and what he wishes to avoid, be it bladder or peritoneal cavity. The peritoneum has been opened by the cautery with no ill results. So long as intestines are not burned, no peritoneal opening could be made under more aseptic precaution. The bladder, rectum and ureters only are to be avoided. The uterine arteries, if not exposed, may be destroyed by the deep cooking process with impunity, for they will, long before the slough comes away, have been effectually sealed. Dr. Byrne suggested that no packing be used in the crater subsequent to the cautery, as in its removal the slough might be forcibly torn away and hemorrhage follow. Natural separation I have never known to produce any bleeding.

"The best results may be secured by not placing the heated dome against the tissues, but by holding it near them, thus allowing the heat to make the greatest penetration, roasting them as it were. If the bladder is well held up by a wet gauze-protected retractor it will never be damaged; neither will the penetration of the heat reach the ureters unless it is much overdone.

"It is only within the past five or six years that I have been doing this work in a manner which has appealed to me as effectual in this class of cases. Some of the patients have lived two or three years very comfortably; two have been, I believe, absolutely cured, now living, one four and the other five years. One had passed the menopause, and she has a shriveled cicatrix where her uterus was, and is well. The other was not yet past the menopause and had hematometra after the cautery, by occlusion of the uterine canal, for which I did a vaginal hysterectomy. This uterus was investigated thoroughly after removal and not one slide showed any vestige of cancer tissue in it. She is well five years after the last operation. In general, all of these patients have been made more comfortable than were those whom I formerly operated on and have lived longer.

"I have done several hysterectomies for those whom I cauterized three or four times previously to the operation. The effect of the cicatrix deposits after the use of the cautery has been to inhibit the growth of the cancer to an extent which warranted me in making the attempt to do a radical abdominal operation later.

"I wish, therefore, to suggest the idea of using the cautery as a means of preparing a limited number of these patients for later radical operation. I have further to suggest the use of the cautery freely before doing a radical operation, with the idea in mind that no inconsiderable part of the subsequent recurrences in the scar, as before outlined, are due to fresh infection of the raw surfaces at time of operation.

"I believe that free and deep cautery of the cervix before radical operation does more to prevent such recurrences, as no other means has been devised that will not at times fail. This I believe to be a very much more important step in the technic of the radical operation than would at first thought appear."

This paper of Dr. Frederick is a belated tribute to the late Dr. Byrne, who is too little known as a member of the Royal Chirurgical Society of Edinboro, former president of the American Gynecological Society, and author of the section on Electrothermal Surgery in the Bigelow-Massey "International System of Electro-Therapeutics." It is a sad comment on contemporary surgery, and its tendency to a blind adherence to prevailing fashions, that the radical teachings of this forceful man were absolutely neglected during his lifetime. We are reminded by this turning towards his methods twenty years afterwards of the plaint of the mother of another Scotchman of somewhat similar name, the poet Burns, on being shown the elaborate monument erected after the death of her son: "He asked for bread, and they h'a'e gi'en him a stane;" though in this case the 'bread' involved the life of others."

In recalling Byrne's work it should not be forgotten that he was handicapped by the absence of power currents in those days, which make this operation so simple to us, but was compelled to employ troublesome acid batteries.

As evidence of Byrne's prevision of the parasitic nature of cancer note his advice against irritating packings, and the temporary control of bleeding surfaces by strong, tissue destroying agencies when not immediately destroyed by heat.

The comparative value of the thermocautery and the newer methods of ionic sterilization will be discussed in a future number of the JOURNAL.

G. B. M.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M.D.

Report of Case of "Splenic Leukemia" Treated by X-rays.

By J. T. Dunn, M.D., Louisville, Ky.

Mrs. G., age 26, has child 16 months old; previous health good. Soon after the birth of her child there appeared a tumor in her left side beneath the ribs, which continued to grow. Her health began to fail, and in spite of all treatment she rapidly grew worse. She was taken to the hospital for operation but her blood count was made and the operation was abandoned with bad prognosis.

She went to Dr. Dunn for x-ray treatment. Her weight was 110 pounds. Her face and limbs were very thin, and there was great debility. Her abdomen was as large as of a woman at full term of pregnancy. There was amenorrhœa and the urine was negative.

A dense mass involving the spleen filled over half of the abdomen. X-ray treatment was begun and given over the splenic tumor almost every day; in all seventy-five treatments were given in ninety days, with a hard tube for ten minutes at a distance of ten inches. After two weeks the appetite was improved very much and the patient felt much better. After thirty-seven treatments the tumor had markedly decreased, the sweats disappeared and the patient was able to go wherever she pleased. At the end of the first month she had gained to 119½ pounds in spite of a loss of ten pounds in the tumor itself.

After seventy-five treatments she was dismissed, and after three weeks the menses returned. A few more treatments were given in spite of the claims of the patient that she was well.

The first blood count showed red blood cells to leucocytes in the proportion of 35 to 1, and eosinophiles 7 per cent. and myelocytes 38 per cent. The second count, eight months later, showed red cells to leucocytes in proportion of 149 to 1. Eosinophiles 5 per cent. Myelocytes 15 per cent.

Roentgen Ray Therapy and Its Practical Application in Malignant Lesions (*N. Y. Medical Journal*, Jan. 28, 1911).

By Dr. Rudis-Jicinsky.

Every Roentgenologist knows that after several sittings and exposures of epithelioma, cylindrical cell carcinomata, carcinomatous simplex, and flat celled carcinomata changes take place in the lesions proper with various metamorphoses or degenerations pointing to the fact that the Roentgen rays have a selecting power for diseased cells, especially in some

individual cases. The subjective results in every malignant case whether they are combined with operation or not, at least, relieve the suffering of the patient and prolong life. He finds his records show many cases that have remained well and no sign of recurrence after five and six years especially of epithelioma, while patients with inoperable deep cases and those of carcinoma of the mammæ, progressed well with no metastasis nor intoxication taking place and terminated well. He calls attention to the improvement in all cases where what he calls the electro-chemical action of the rays are complete and the intercellular tissues in the lesion exposed become so abundant as to nearly obliterate the cellular elements, the hard parts of these carcinomata becoming softer and showing honey like discharge, or an exudate showing itself at all points of the sloughing as a spontaneous cure takes place.

He calls attention to the favorable experience with fibro-carcinoma and also the unfavorable results in carcinoma molle, while the results are better in the deeper colloid carcinoma, and melano carcinomata.

Remembering the honey-like substance poured out by all favorable cases that were sloughing, he decided to try and see if he could bring about in certain cases a specific reaction by means of this honey-like fluid which has some very active properties.

To test the activity of the honey-like fluid he carried out the following experiments. He implanted the honey-like exudate under the skin in healthy tissues without producing any reaction and only in three cases out of twenty did he have the least local infection. If a very small quantity of such substances from the cancer of a rabbit or those suffering from any wasting disease or injury was used, definite symptoms were produced, as of 1 to 20° F. with local inflammation. The microscope showed that the basement layers of connective tissues, and especially the walls of the blood vessels, became swollen and thickened by their conversion into a translucent, firm, glassy, yellowish material, albuminous in character. The parts of the lesion felt harder than usual and had a dull, shining appearance and some direct transformation of the tissues progressed rapidly, the parenchyma cells undergoing atrophy, as a result of the pressure from the swollen degenerated tissue. Around each localized lesion produced there was an area, more or less marked, of heat and redness, and with the increasing congestion we had later a casting off of pieces of necrotic tissue, and the forming of a tumor, the cells of which advancing on the periphery, made their way through the lymph spaces and formed new foci. In some cases metastasis followed in different parts of the body in general and another tumor would form. These secondary tumors being

or those of early stages, with surgical removal if necessary, followed by the x-ray treatment and also before by x-ray will give the surest and safest recovery from cancer.

Even in deep and inoperable cases where the resistance is good, treatment by the rays alone accomplishes wonders.

The sloughing in an open lesion will progress more rapidly and with better results, the effects of our raying being more promising in the most terrible cases if the exudate of the lesion is applied to those portions of the same, where the fighting material for the repair of the cells is most needed for the obliteration of the diseased cellular elements, liquefaction of the same or absorption and degeneration occurring.

ORGANOTHERAPY.

EDITED BY I. OGDEN WOODRUFF, M.D.

Report of 28 Cases of Gonorrheal Rheumatism Treated by Vaccine.

Young (Virginia Medical Semi-Monthly, Vol. XV., pp. 121-123) reports 20 cures in 28 cases. These were cured in one to fifteen injections. They included slight and severe cases. One was only a tendon sheath involvement. The doses used varied from 5-50 million. The initial dose was from 5-25 million. The clinical symptoms were used as the guide to the dosage.

There is a distinct lack of detail in the report which would be of interest to one desirous of carrying out similar lines of treatment.

Value of Gonococcic Vaccines in the Treatment of Gonorrheal Arthritis (Champion, in the *Atlanta Medical Journal*, Vol. 56, pp. 83-85).

In this paper eleven cases are reported. Of these only two were confined to bed. Only five had more than two joints involved. No other joints were involved after the first injection. Injections were started with an initial dose of 25,000,000. On the third day 50,000,000 more were given, and then a similar dose every four days. The length of treatment in the various cases is not stated.

While most of the literature on the use of gonococcus vaccines in gonorrheal arthritis is distinctly favorable in tone, the very limited experience of the departmental editor has not been so fortunate. The few cases in which he has employed it have been severe cases, with multiple joints and tendon

sheaths, and in one or two instances complicating an exacerbation of a long standing uncured gonorrhea. In these cases though the joint symptoms were acute and the patients confined to bed, no reaction occurred until 500,000,000 were injected. In them other joints developed despite the employment of the vaccine, and in one or two days after the slight reaction produced by 500,000,000 organisms, an acute epididymitis developed.

In general the use of the serum has seemed more satisfactory though neither are of marked benefit in bad cases so long as the urethra remains in bad condition. I. O. W.

PHOTOTHERAPY AND DERMATOLOGY.

EDITED BY HERBERT F. PITCHER, M.D.

Epithelioma and Its Treatment. By W. U. Wallace, M.D., Brooklyn, N. Y. (from the *American Journal of Dermatology*).

The author of the article divides epithelioma into three classes: those above the skin, those below the skin, and those on the skin. To the first class belongs the pigmented mole and elevated nevi, which have undergone malignant change; malignant senile keratosis, and those soft vascular tumors so often seen springing from scars following operative procedures for removal of epitheliomas. For this class the primary treatment is destruction of the superficial growth with the electric needle; negative pole in growth and positive on abdomen. This is practically painless, is speedy, sure in action, and free from danger of any kind. When the growth has been reduced to the level of the skin, he uses the Roentgen ray treatment, a low vacuum tube energized preferably by a static machine, five to ten minute exposures three times a week, and in from three weeks to three months the patient is well. The length of the treatment depends upon the size of growth and location. In the squamous cell type the author claims that only the x-ray is needed. In some of the flat, slowly spreading types the use of the ray is often brought to a point of producing a mild dermatitis for they are at times the hardest to combat. He thinks that radio-theraputists to be successful should have the *radiographic sense*, just as surgeons have the surgical sense to be a good surgeon. A sort of intuitiveness more than logical reasoning that guides the operator in judging time, distance, frequency, and amount of

penetration to be given to the individual case and at different stages of the treatment in the same case.

In the third type or subdermal class he relies upon the primary treatment on that old and tried and true friend, arsenious acid paste. This is used for two purposes: first, to get rid of the dead and sloughing tissues, and to get a clean sore; second, to start up quickly an inflammatory action that will be somewhat widespread and occlude the lymphatics temporarily till the x-ray can get in its work and seal them up permanently.

The author claims to have treated over a hundred cases in this way in the past ten years, and he has yet to have a primary case from the muco-cutaneous junction that did not promptly get well. He does not believe the action of the x-ray to have special selective action on cancer cells, but it has a very marked action on all lymphatic cells and structures. He thinks the x-ray acts by setting up an inflammatory condition exposed to its action and a proliferating endarteritis in the minute arterioles, thus cutting off the blood supply and literally starving the cancer cells to death. This action explains why we *never* have a metastasis and seldom a recurrence after x-ray treatment. The law of the x-ray in these cases is: that the prognosis is in direct proportion to the vascularity of the part affected. He speaks of the lip where the ray is the least successful, simply because the vascular supply is so great that the ray cannot combat it, cannot get up enough cell growth to block the arterioles and lymphatics and as a result often fails.

Colored Light in Diagnosis of Eruptions, etc.

Freund says that the blue light from burning soda and other monochrome lights may reveal slight changes in the skin that escape detection by other means. The colored lights are of not much use for differentiating cutaneous affections, but with them it is possible to seize the faintest, unpossibly briefly transient eruption or efflorescence and thus permit the correct diagnosis, unattainable in any other way. At the Vienna clinic for syphilis and skin diseases in charge of Finger, the mercury or soda light is used to reveal red eruptions while the bluish discolorations are sought for with the red lithium light or the yellow flame. The soda light is obtained by pouring a little soda into a grooved platinum ring fastened in a gas jet or in the flame of a Bunsen burner. Lithium gives a red, and thallium a green light, filtering the light through colored glass also gives interesting findings.

HIGH FREQUENCY CURRENTS.

Thermo-penetration. By Dr. Ernest Eitner of Vienna (*Wiener Klinische Wochenschrift*, September 1, 1910).

If proper care is used, the method is devoid of danger.

Many of the apparatus now on the market are of improper construction and deficient in quality of current. If the sparking is not perfectly regular, the condensers become heated and useless. He prefers the Poulson lamp. This is an arc lamp which burns in hydrogen gas. If the sparking is not perfectly regular, undamped oscillations occur which produce muscular contractions. In treating joints he uses a large indifferent electrode at some distance and a smaller electrode over the joint (*labile*). The duration of treatment is from 15 to 45 minutes.

Twenty-one cases of gonorrheal arthritis were treated, eight of these were acute cases, six were cured by thermo-penetration of the involved joints, and genitals in a very few days, without other treatment. Two interrupted the treatment. All the acute cases were relieved quickly of pain. Very favorable results were shown in the chronic cases. Eleven cases of rheumatic arthritis were treated. Two cases of acute involvement of the wrist and hand were cured in a few days with thermo-penetration alone. Five cases received salicylic acid preparations in addition from the physicians referring them. One case of chronic polyarthritis of knee, elbow, hand and several finger joints was so much improved by two months' treatment, that motion was fully restored. In two very old cases the result was not so good. Two cases of gout with painful tophi were permanently improved. One case of neuralgia of the ulnar nerve was cured. One case of sciatica and one case of neuralgia of the trigeminus were treated without any result. One case of chronic bronchitis was materially improved. All cases of acute gonorrhea have been treated during the last one and one-half years, with thermo-penetration only during the first few days with the results of rapid amelioration of the burning and pain. He warms the pendulous portion between two electrodes. After the sensitiveness of the mucous membrane has subsided medicament treatment is added. The introduction of metallic electrodes in the urethra is condemned, because it is possible to damage on account of imperfect distribution of current. He uses, however, a syringe of peculiar construction. With this he fills the urethra with a one per cent. solution of nitrate of silver, the syringe is held by the patient and serves as one electrode. The other electrode is placed over the skin of the penis. The parts are warmed to about 40° to 42° C. for one-half hour. Prostatic involvement is seldom treated by the writer with thermo-penetration. Care should be exercised to use only undamped

oscillations because if muscular contractions occur when using this method, pus is readily carried to healthy parts.

Twenty-nine cases of epididymitis were cured. Naevi, angioma papilloma, fibroma, and warts have been removed by utilizing the cauterant action. Epilation can be done with good cosmetic result. Well insulated fine needles are introduced in or near the hair bulb attached to the current, the other electrode being held with the hand. A very small amount of current suffices. One second's contact is enough. Cases of psoriasis, chronic eczema and one case of lichen ruber planus have yielded favorable results.

RADIOGRAPHY.

Intensifying Screens in Radiography.

The majority of radiographers who are doing the very rapid work are using intensifying screens to aid in the exposure. The time of exposure is greatly shortened without an extra strain on the tube. The screens are extremely delicate and require the best of care, and some quotations in the January *Archives of the Roentgen Ray* are well worth repeating.

"Professor Krause of Bonn considers that both the Gehler-Foli and the Singrave screen are greatly deteriorated after some eighty exposures. Dr. Josserand, on the other hand, considers that the vitality of the screen can be retained indefinitely if the following precautions are used.

"1. Keep it in a well dried and lighted room at some distance from the Roentgen apparatus.

"2. Keep it in the transparent envelope in which it is supplied. Do not lay it down or put books or anything else on it.

"3. Handle with perfectly dry hands, and do not touch the fluorescent surface with the fingers. Do not breathe on it or expose it to moisture or damp in any way.

"4. Dust both the plate and the screen with a large camel's hair brush previous to using and only place the plate and the screen together at the moment of using.

"5. The plate should be placed in its carrier films upwards, with the fluorescent face of the reinforcing screen against the film.

"6. It is a good plan to warm the plate slightly before use, by wrapping it for 5 minutes in a very dry hot towel.

"7. After exposure remove the screen from the plate carrier at once.

"8. Be careful that the pressure between the plate and the screen is uniform, and that there is no air film between them.

"9. After making an exposure the screen should be left to rest exposed to the light for at least two hours before being used again."

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HYPEREMIA NOT DIATHERMY.

THE discussion of means of inducing hyperemia in the tissues, including dry or moist heat, and radiant light and heat, cupping, counter-irritation, blisters, and the use of the girdle obstructing the circulation, designated as passive hyperemia, should all be looked upon as methods of producing that effect, giving the main thought to the hyperemia, and not to the method. The best means of inducing hyperemia should be chosen to meet special indications. Too often the consideration of a method obscures the correct conception of the effect sought.

Physical therapeutics properly includes the application of physical means to the production of physiological reflex responses, in connection with an intelligent understanding on the part of the operator of the indications to be variously met under different pathological conditions. To talk or write of "*diathermy*" as a method of using heat in the tissues with or without reference to the induction of hyperemia is too apt to take the mind of the student away from the main thought—the effect. The hyperemia is the object sought and the method should be considered as part of a technique employed as means of producing the therapeutic effect.

The introduction of a new term in medical literature, which employs a *modus operandi* of inducing heat in the tissues already known as a distinctive method should be disparaged for the above reason. The thermic effects are produced by

means of the d'Arsonval current employing the direct bipolar method with the regulation of varying degrees of amperage and methods of localization as indicated. In consideration of the technique attention should be directed to the character of the current producing the effect and the regulation of the current strength and size of electrode to the thermic requirement in each case, the object being the induction of a localized active hyperemia.

The literature should not be further burdened or obscured by the introduction of new terms which are neither distinctive nor appropriate, and which can serve no other purpose than to give some observer on whom part of a truth has dawned, undue credit. The fact that heat effects are produced by a certain method without due attention or reference to the importance of the consequent hyperemia produced is empiric. The consideration of a method of heat production without the physiological consideration of the effects of such heat production upon the tissues is not scientific, and when it employs a well known method it also lacks novelty.

Hyperemia as a therapeutic measure is one of the most valuable of alterative procedures and has been recognized under the name of counter-irritation, the employment of hot applications, cupping, blisters, hydrotherapy, and numerous other ways from the earliest days. The idea of counter-irritation and derivation have only a relative value in fact; while the recognition of hyperemia and its influences upon nutrition, altering metabolism and increasing the presence of fresh arterial blood in the tissues is deserving of the greatest consideration and of more scientific study than has to the present time been devoted to the subject.

The more modern means of inducing hyperemia, including the deep effects of radiant light and heat and the thermic effects of direct d'Arsonval administrations, have awakened a new interest in this subject which is certain now to be promptly recognized from the proper physiological point of view. The general adoption of these most valuable means of inducing hyperemia by the profession at large with the correct idea as to their therapeutic indication must supplant the very superficial consideration of the subject from the standpoint of the advocates of the so-called "Bier's Hyperemia." The time will thus be hastened when the scientific and systematic em-

ployment of the best methods of producing hyperemia will be recognized and they will be employed with greater certainty and efficiency. A subject of so much importance should be treated from the point of view of the physiological effects of hyperemia with the names of men and new names for old methods omitted.

Hyperemia as a therapeutic measure accomplishes valuable physiological effects, all of which favor restitution where abnormal conditions are present. The most important of these are (1) an increase of metabolism with the greater flux of circulation through the tissues, (2) increased nutrition, and (3) destruction of germs in the tissues, because with the influx of more blood in the tissues, there is an increased presence of nature's scavengers—the phagocytes. Looking upon hyperemia from this point of view, we have an explanation of the process of resolution, with elimination of infection from the tissues with the arrest of inflammation and prompt restoration of the parts to normal.

Most of the measures which produce hyperemia, coincidentally produce a relaxation of the contracted tissues, which results in relief from pain. The application of radiant light and heat or convective heat produce such relaxation with hyperemia, otherwise it would increase pressure and pain. Likewise with the same agents there is an increased elimination through perspiration due to the heat produced, thereby throwing off some of the toxic materials and the products of defective metabolism, all of which favor the restoration to normal of the functions of the tissues in an inflammatory area. With actively induced hyperemia there is also increased activity of the lymphatic channels of elimination due to the increased metabolism thus induced and indirectly to the cause which induces the hyperemia.

The important subject is *hyperemia* and its effects; and the methods of producing it while essential are subordinate and should never be allowed to overshadow the valuable effects sought from their employment.

NORMAL BLOOD PRESSURE.

It is a common error of physicians, often made by those high in the councils of the profession, to tell their patients that a blood pressure of 140 to 160 mm. of mercury is normal at ages varying between forty and sixty years. This should never be said, when it is so common to find men at these ages whose blood pressure does not exceed 120 mm. The error can only be explained from the fact that there is a want of confidence in the minds of the profession in the use of drugs for the regulation of blood pressure with those who are unfamiliar with the auto-condensation method, and they are not disposed to discourage patients whom they cannot relieve.

Some physicians properly tell their patients to take a great deal of exercise and eat less, and thereby regulate their diet to their exercise. This, however, will rarely reduce an accumulated blood pressure; whereas by the combination of a regulated diet with the employment of d'Arsonvalization—a measure which will effectively and without other detrimental effect lower blood pressure—most of the early cases can be restored to a normal pressure at which they can be maintained afterwards by the institution of a properly regulated regime of diet and exercise. Those who are familiar with the methods which obtain these results will agree with the writer that it is not proper to say that an *abnormal* blood pressure is *normal*.

What the normal blood pressure is, is a subject upon which men differ; probably owing to different methods of reading with the sphygmomanometer as well as the observation of cases of hypertension under conditions that do not restore them to normal. Those who take the reading at the first return of the pulse, will always read higher than those who read when the full pulse has returned. There is no reason why the reading should be made until the instant when the pulse has just the strength that it had before the pressure of the constricting band was applied. Read in this manner it will be found that in health the average normal tension will be between 105 and 120 mm. in males, and 95 and 110 mm. in females. These figures are verified by all who have made observations by the method and under the conditions described, and in a large number of the class of cases which have not already been affected by the causes of hypertension. As age advances it

should not be said, as was stated in a leading medical journal by a recent writer, that a certain number of millimeters should be added yearly as representing the normal as age advances. The fallacy of this statement is found in the fact that the average is based upon a progressive tendency to an abnormal tension, as representing the normal of advancing years.

Normal arterial tension has nothing to do with the age of the individual. It is found that men, who have lived a moderate, active and abstemious life, and are in perfect health, will, as a rule, be found with a blood pressure even at fifty or sixty years of age, not exceeding 120 mm.

It is a dangerous teaching which places the normal at any age as high as 135 or 140 mm. when by correction of the progress of the process of auto-intoxication which is leading up to an advanced arteriosclerosis, it would be arrested. With the first onset of hypertension preventive medicine is indicated. In other words, when the tension begins to show a rise above normal there is something wrong in the habits of the individual; which if corrected by a systematic regulation of diet as to the quality and quantity of food, to the exercise or consuming capacity of the individual the progress of an early hypertension which will lead to arteriosclerosis, will be arrested.

THE WAR AGAINST VIVISECTION.

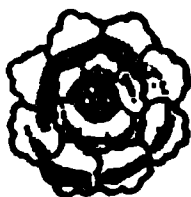
THERE probably never was a more unreasonable or inconsistent campaign instituted against scientific laboratory studies than that of the anti-vivisectionists. This organization is composed of sentimental persons, whose philanthropic vision is circumscribed and who usually are opposed to the progress of medical science. Another example of similar antagonism was instanced by the narrow-minded opposition to the establishment of a National Department of Health.

One medical man has been recently imported from England—a man who admits that he is already superannuated as far as active work is concerned, and now joins himself in the fight of the reactionaries against the scientific investigators who are endeavoring to demonstrate important methods in therapeutics; because they require the sacrifice of the lives of the lower animals. The animals so sacrificed are usually

not edible or the opposition might be less vehement, for there is no evidence that these objectors are vegetarians.

Investigators in the performance of these experiments are humane, not causing unnecessary suffering, the work is being done in the most conservative manner and done for the purpose of saving human life. For anyone to assume to say as this medical man from England has said that no benefits have been derived from serum therapy, is a remarkable evidence of mental incapacity or a display of ignorance or inexperience. The verified statistics of the lower death rate in diphtheria and cerebro-spinal meningitis, disprove the fallacious statements of these sentimentalists. The effort on the part of the various cults who assume to do wonderful things, when in their methods they are unscientific, is reprehensible and not deserving of the credence of fair-minded people. The accomplishments of the medical profession during the past generation in the matter of diagnosis, therapeutics, and prophylaxis, are deserving of the most charitable and conscientious public recognition.

That the science of medicine is progressive, results confirm; but that perfection has yet been approached there are none to pretend. That the profession should be hampered in its scientific researches by a set of sentimental half-poised human beings, who are generally both loud and inconsistent, is a matter of concern; but they are hardly to be feared before the tribunal of a healthy public opinion.



LUMBAGO.*

BY E. HOWARD HUMPHRIS, M.D., F.R.C.P., LONDON, ENGLAND.

Lumbago I have seen defined as muscular rheumatism affecting the muscles of the back, but if this were the truth, the whole truth and nothing but the truth, this paper would be much shorter, more satisfactory and complete than I fear it will be. The term *lumbago*, like charity, covers a multitude of sins. Do not the Christian scientists teach that all pain is a manifestation of sin? It is the variation in the pathological conditions which makes treatment and prognosis so difficult.

A distinguished colleague of mine remarked to me when he heard I had been asked to read a paper before you and that I had chosen lumbago as my subject, "I hate to see a case of lumbago come into the room; at one time you get a brilliant success and the next time with an exactly similar case you can do no good." If we define lumbago as a pain in the back like rheumatism we shall meet "exactly similar" cases. It is with a view to differentiate between the various conditions known under the name of lumbago that I, with much diffidence, venture upon that somewhat presumptuous task.

Two reasons led me to introduce the subject, one was that when I looked up in the index of the book on Static Electricity written by the man whom we acknowledge master of that subject, lumbago did not appear in the index, and only had the briefest mention under the general heading "Myalgia," and the other reason was the relative paucity of papers which had been presented to this Society on this subject as compared with the frequency of the condition. On looking backwards through the transactions for the past seven years, the excellent paper by Dr. Brookbank in 1906, appeared to be the only one; and if this paper can provoke the same amount of interesting discussion, brought up to date, I shall feel that the subject was not altogether unwisely chosen.

*Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association at Saratoga Springs, N. Y., September 14, 1910.

Etiology.—As regards the etiology of lumbago, the attack can usually be traced to exposure to cold and damp, sometimes to trauma, with possibly a gouty or rheumatic diathesis present. As Brookbank pointed out the onset is usually acute but in reality it supervenes on a chronic condition either latent, or known to the patient.

Pathology and diagnosis.—Gowers set forth the theory that lumbago is due to an inflammation of the fibrous tissue with which the different nerve endings (muscle spindles) are surrounded. But, as a fatal result of lumbago is (as far as I know) unrecorded, any real knowledge of the actual pathological condition is still a matter of conjecture.

It is not easy to differentiate the pains of lumbago, which generic term the patient uses to describe his suffering. If the pain be worse when the patient bends forward as in the act of lacing his shoes the pathological lesion is probably in the psoas and quadratus attachments, if it be worse in straightening himself up the erector spinæ muscles are involved.

If there be an intense dull pain from the sacrum to the third dorsal vertebra, not increased on spinal movement Schreiber notes that this is an indication of the *facia lumbodorsalis*. Rolling the thigh upwards shows that the psoas muscles is involved, but this rarely happens in the psoas alone, the quadratus is almost always similarly affected. When there is pain in the back from the 4th to 7th ribs, which is increased by deep inspiration and uninfluenced by bending, the serratus posterior is the offending muscles.

When movement increases the pain in the muscles, pelvic or renal disease may be excluded as a rule from the diagnosis.

The neurotic spine, sacro-iliac disease, the pain from a loaded colon and from hæmorrhoids, cancer of the spine, cancer of the sacro-iliac notch, are easily excluded as a rule.

I have seen one case which was referred to me as lumbago which proved to be referred pain from an enlarged prostate, and which entirely disappeared as the prostatic condition improved.

The violent backache which ushers in dengue, influenza and other conditions of toxæmia, although it is markedly aggravated by movement, is easily differentiated from lumbago by the elevated temperature which always accompanies these disorders. Lumbago may be mistaken for reflex troubles and affections of the vertebral column, more especially a periostitis.

Persistent lumbago may be confounded with Pott's disease of the spine, or with sacro-iliac disease (which two conditions are practically identical). Here the pain may be confined to the lumbar region or may radiate down the sciatic nerve, even as in lumbago. Examination per rectum will assist in the diagnosis, since it may reveal tenderness in the region of the sacro-iliac articulation. Also pain will be elicited when the sides of the pelvis are pressed together, and there may be local swelling and temperature.

Sacro-iliac relaxation is sometimes the true pathological condition to be found when the patient comes complaining of lumbago, more especially as here too the pain may be referred along the sciatic nerve (this of course being due to the involvement of the lumbo sacral cord passing over the upper part of the articulation, and the pain caused by the tension thus induced). In a patient suffering from this relaxation there is no pain on pressure of the sciatic nerve nor over the lumbar muscles, which can also move without any pain, although a rectal examination may reveal a tender spot in the region of the articulation. There is not only no pain when the sides of the pelvis are pressed together, but while so pressed the pain previously complained of is less or absent.

I have dwelt at some length upon the sacro-iliac joint, for it is here that we so often encounter a point of obstinacy in the disease which I have sometimes diagnosed as a rheumatism of that synchondrosis. Lumbago, I believe, as Dr. Luff pointed out at the Polyclinic (London) last March, commonly begins as a localized affection of the insertions of the muscles in the vicinity of one or both of the sacro-iliac joints, and spreads by continuity of the fibrous tissue, as is manifested by its affecting the tendinous attachments of the neighboring muscles, by its affecting the sacro-iliac joint itself and by its often spreading through the joint and reaching the sheath of the sciatic nerve.

But, perhaps, though far from exhausting the subject, I have said enough at present on the subject of pathology and diagnosis of lumbago.

Treatment.—The subject of treatment is on a more satisfactory basis and one turns to it with comparative relief. I suppose that we are all of us here more or less successful in the treatment of lumbago and to the Fellows of this Society I have nothing new to offer, but in order to complete

the outline of the subject, I will briefly recapitulate the treatment I am in the habit of employing. Firstly, I see that the bowels are freely moved with a saline, possibly preceding it with mercury. I also order:

R Sod. Sal. Gr.20
Sod. Cit. Gr.30
M. mitte tal ad No. 6
Sig: To be taken in a glass
full of hot water every 4,
5, or 6 hours.

This prescription was given me by Mr. Tubby, the London surgeon, eighteen months ago and I have found it invaluable. As much heat as is possible with a hot water bag over the seat of the pain is also indicated.

When the patient can continue to come and see me I apply radiant light and heat with the 500 candle power incandescent lamp for 15 to 20 minutes, followed by the static wave current for the same length of time.

This is to my mind the ideal treatment. In some few cases where I deemed it not advisable to use the wave current I followed the exhibition of the light with ionization, using a very hot 2 per cent. solution of lithium iodide, to which I added a few drops of tincture of iodine, so as to get an excess of iodine, using a current density up to 1 m.a. per square c.m. according to the toleration of the patient. In one case when the patient could not stand iodine I administered salicylic ionization and obtained marked relief from the pain.

I, as well as some of you here, have found mechanical vibration and the static indirect spark of use in some cases, but where possible the high candle-power lamp followed by *static* wave current in my opinion is much to be preferred. The light dilating the capillaries lowering the blood pressure, and causing diaphoresis while the wave current tends to remove the infiltration, squeezing out the serous exudation from the tissues; all of which actions diminish the pain.

When the patient cannot come to me I advise freezing the skin over the painful area with ethyl chloride (if this be not immediately successful it is not to be repeated). If this fail, acupuncture is sometimes attended with astonishing results, the skin having been washed with soap and water, is swabbed over with iodine, when needles, which have been sterilized in a flame, are plunged in the painful points of the

muscles and allowed to remain 20 minutes to one hour. Sir James Grant states that possibly the needles set free an excessive storage of electricity which has accumulated in the muscles.

If the patient be going on a journey strapping with adhesive plaster affords great relief. The patient is strapped much as one would strap for a broken rib, only of course lower down over the seat of the pain.

The internal administration of iodine is much recommended, but I am glad to say hitherto I have failed to encounter any case of lumbago which did not yield to the therapeutic agents I have described.

Many illustrative cases I could instance, and so I presume could most of you present, but at the risk of repeating your own experiences I should like to quote two typical cases.

Mr. H. A., aet. 56, had suffered from lumbago for ten years. He was never entirely free from pain and sometimes it became so severe as to prevent him attending to his business. It was during one of these acute attacks that he was referred to me. On examination there was the typical pain of muscular rheumatism. Every movement would elicit an expression of pain. At the end of 30 minutes combined application of the 500 candle-power light and of the static wave current; the acute pain had gone and the patient could move in comfort. Patient, though very pleased, complained that there still remained some pain in the form of a dull ache which appeared to be over the sacrum and up to the level of the third dorsal vertebra. He came 14 times in all. The acute pain returned some 3 or 4 times—each attack being of lessening intensity with gradually lengthening intervals until they ceased entirely. The dull ache gradually improved, till there remained only an occasional linear pain corresponding to the sacro-iliac synchondrosis. The patient is now in a condition of freedom from pain altogether—except when he is much fatigued, when the ache in the synchondrosis will temporarily recur—but disappears without treatment.

Here we had a true acute myalgia supervening on a chronic affection both of the fascia and of the joint, with possibly some thickening around the latter. The patient in my opinion will be liable to relapses which should readily yield to treatment.

As a typical case of simple lumbago I may cite that of Mr. D. L. R., aet. 30, who came to me last October, his doctor saying he had had lumbago for 4 days. He moved with a good deal of pain, and stepping on to the insulated platform caused him to cry out—at the end of 20 minutes. Static wave current 8 in. to 10 in. spark gap—with an electrode 10 in. by 8 in.—patient stepped down, saying that he had no pain whatever. The patient returned on the following day with a feeling in his back which he described as more of a discomfort than a pain. The treatment was repeated, complete relief obtained, which has been maintained up to the present time. I do not anticipate any return. It would be easy to extend the recital of the successful treatment of lumbago, and I do not think the advantage would be commensurate with the loss of your time. I thank you.

8 West Chapel Street, Mayfair, London, W.

Discussion.

Dr. Herbert F. Pitcher, Haverhill, Mass. I would like to thank Dr. Humphris for his most excellent paper. It is a great pleasure to hear Dr. Humphris read a paper. It is also very easy to discuss his paper, because there is so little to say after he has finished. But there is one modality that he did not mention that I have used with great benefit. Of course, it is nothing new, only he did not happen to mention it. That is, the high frequency current from the condenser vacuum tube.

I would like to relate a case that came to me with typical lumbago. The patient, a man of fifty years of age, was superintendent of a hat factory where he was obliged to go up and down stairs many times a day; he had not been able to sleep on account of pain in his back for three or four nights; he came to the office in a carriage. I had him lean over a chair, and I applied the condenser vacuum tube to his back from a twelve plate static machine, connected to a Waite & Bartlett hypostatic machine. I gave him a spark gap of about two inches, and he said it was pretty hot. As it relieved his back I had him stoop over more and more until he almost touched his hands to the floor. I treated him for twenty minutes and gave him some sparks from this same condenser tube. I told him to return the next day. I did not see him for a week, and supposed I had almost killed him. I met him one day, and he said he did not return because he had been perfectly well since.

Dr. William Benham Snow, New York. In the first place, I want to say that Dr. Humphris has described what we also

term myalgia. There are two types of conditions variously called lumbago—the muscular type, and another type not properly a lumbago, but a joint involvement, either in the lumbo-sacral area of the lower lumbar or in the sacro-iliac joint. The pain in those sacro-iliac cases is in the contracted quadratus lumborum and glutei muscles on the affected side—a contraction due to the joint inflammation. I had last winter four of these cases, in all of which there was this disability. I treated these cases rather more heroically than Dr. Humphris. I apply the wave current and sparks vigorously over the gluteal and lumbar muscles, and in the sacro-iliac cases also employ the wave current internally. As Dr. Humphris can make an examination with the finger and locate a sacro-iliac involvement, so we can treat that sacro-iliac involvement through the rectum and relieve the complicating neuritis. I use the same electrode as in treating prostatitis, carrying it to the affected side and, in acute cases, make two applications of the static wave current on the same day at intervals of 10 or 12 hours. I find by so doing, as in acute sciatic neuritis, the results are more prompt and certain. These are the cases of neuritis which have occasionally been cured by nerve stretching, probably by reducing in a measure a sacro-iliac luxation.

I wish Dr. Peckham to state some of the good points he can give on the treatment of the sacro-iliac affection. He is familiar with that work. The exercise that I use at his suggestion is to have the patient take a position on the back and throw himself into the opisthotonus position, thereby bringing the muscles of the back to act, and thus draw the sacro-iliac joint into proper position. I find that with exercise in connection with the static treatment and light, which I use before the static treatment, these cases, if not of too long standing, get well. The four cases were all cured; one in ten days, one in one week, and the other two also got well promptly. It used to be impossible to relieve these cases, but we can now cure them with exercise and static treatment.

I wish to thank Dr. Humphris for his excellent paper and for again bringing this important subject before the Association.

Dr. G. Betton Massey, Philadelphia. One of the most interesting parts of Dr. Humphris' paper to me were the remarks on the differential diagnosis. They reminded me of a number of cases that I had failed to relieve by both the constant current and static sparks that possibly I did not succeed in diagnosing. I really think that there is much that we do not know, that there are many cases that we do not properly diagnose. I have met a number of Waterloos. They are not all Waterloos, because I remember distinctly two cases that were not sciatica. These were in the small of the back. They were somewhat sudden cases, cases that were of a duration

of some days, possibly a week. The patients were able to get around by hobbling. I can recall at least two cases where a constant current turned on from the negative pole, with a good large pad, for five or ten minutes, cured them completely. Yet the Waterloo came after that, where no form of electricity seemed to do any good. These were not sacro-iliac joint cases. They were not sciatic cases, though they might have been rheumatic cases, in one of which I was myself the patient. I have had twice what I am quite sure was lumbago, and nothing relieved me but the hot flat iron. It seemed to have to be so manipulated as to carry the heat down to the affected part. It is possible that even better results could be obtained with the new apparatus that gives such startling effects of heat penetration by the high frequency current.

Dr. Charles W. Strobell, Rutland, Vt. I would like to say just a word about this matter. Now, of course, we men here are intensely practical, all of us. I look upon this body of men as the most brilliant scientific body in the world. I think all of us have practiced medicine for years. Some of us have been surgeons for years, and we have come out of that, we are progressing, and we are looking in all directions for the practical things in our work. We are not homeopaths, we are not allopaths, we are not osteopaths, we do not belong to any "pathy" at all; we are physicians. It is our duty to, and I believe we all do study any method that is presented to us, picking out what is good in it and using it. It doesn't matter whether anything I may suggest savors of any of these pathies. But I want to say this, that in most diseases there is pain, whether due to joint or true muscular disease. In the class of diseases now under discussion, the pain is, in most instances, in the muscles. Now, why is the pain in the muscles? Because the muscle is contracted. Why contracted? Because of inflammation of the muscle itself, or inflammation in or about the joint. The pinched nerves cause these muscles to contract and thus causes the pain. The great thing to do is to relax that muscle, whether with powerful static sparks, or by intense hyperemia flush it with arterial blood, or by muscle stretching, or by inhibition by the use of mechanical vibration; it does not matter which. The great thing is to relax that muscle. Mechanical vibration of the contracted muscle and tendons will cure sacro-iliac disease, provided it is not tuberculous, cancerous, or syphilitic; and even in these conditions will give a vast amount of comfort and improvement.

Dr. Edward C. Titus, New York. I think the Association should be congratulated upon the very thorough and ready differential diagnosis given us of this common yet sometimes intractable condition which we are all called upon at times to treat. His summary of the methods of treatment and his

conclusions I think can be certified to form actual experience, to be the best we have to-day.

Dr. Frank E. Peckham, Providence, R. I. I think we have all enjoyed the delightful paper which Dr. Humphris has given us. He has taken lumbago, as you might say, as a lay person would understand it, very carefully differentiating the different types of pain in the back which might roughly be called lumbago. I think he might have gone a little further and given us his own idea of what is really lumbago, because the different types which he has selected represent different processes, and in so far mean an entirely different treatment, and it is that careful differentiation of etiological factors and treatment properly applied which makes for success in some of these very obstinate cases. Lumbago or pain in the back may be osteo-arthritis in the lumbar region of the spine. There you get your tense muscles and ligaments and pain in that region. The patient comes in and tells you he has lumbago. What do you mean by that? The next patient comes in with a stitch in the side, and he may have trouble in the sacro-iliac joint. The treatment is quite different. You have got to examine your patient, and your treatment must correspond with the cold facts, not with his statement or somebody else's statement. The sacro-iliac joint becomes relaxed and that is a very important thing. Dr. Snow has spoken of exercise in the treatment of this condition. I happen to have had two attacks, mild it is true, of relaxation of the sacro-iliac joint. By throwing yourself into opisthotonus while lying flat on the back you tone up the joint, and if you tone up the joint properly you will not need anything to hold. Then if you have a myalgia—and that is what I consider true lumbago to be—your treatment is different. I hope Dr. Humphris in summing up will give us his idea of what scientifically should be called lumbago. Because I believe one function of such a society as this should be to help in clearing the way and marking the course along which we should sail, and if we can erect up lighthouses along and say that this is lumbago, and this is osteo-arthritis, and the other is sacro-iliac relaxation, this Society will have done something to help the general progress of medicine.

Dr. Humphris in closing. I thank you very much for the free way in which you have discussed the paper.

I have not used the treatment with the vacuum electrode from the high frequency coil. I will certainly try it any day that the static machine breaks down, but I do not see that there is any advantage, if I want to use the vacuum electrode, of using it from a coil instead of from a powerful static machine. The only time I can see when I would use it would be when the static machine was not going.

I do think, that what Dr. Snow says is true, that very often what the patient comes complaining of as lumbago is a true affection of the sacro-iliac synchondrosis, and that the contracted muscles need percussion over them. It is a new idea to me to treat that affection with a rectal electrode, and I hope to be able to report on that later. In London we get quite a lot of lumbago. I am practically never without two or three patients with lumbago. It is quite easy for Dr. Snow, in the position which he holds and the eminence which he has attained, to spark his patients pretty freely.

Dr. Massey never said a truer word than when he said there was a number of things we do not know. One of the things that struck me while he was talking was this: He said when we have given this iodine from the lithium iodide or salicylate of soda and the galvanic current, it is impossible for us to say whether it was the galvanic current that relieved the pain or whether it was the drug. I certainly think that is one of the things we do not know when we use galvanic ionization. As to the use of the flat iron, I rather think the hot water bag fits a little closer in.

Dr. Strobell said the pain was in the muscle. If the pathological condition rests in the sacro-iliac joint, then a relaxation of the muscle won't get rid of the disease at all. We have got to make our differential diagnosis.

Dr. Peckham paid me a very high compliment when he asked me what was my idea of what lumbago really was. I think there is not the faintest doubt that lumbago should be limited to a true myalgia. The object of my paper was not so much to try and make a definition, as to try and differentiate between the various conditions that a patient may have when he comes in and says he has a lumbago. I have seen everything from dengue and cancer of the spine to prostatic disease called lumbago. Although we can call it myalgia ourselves, yet we cannot educate our patients to call it that, and when they come in and say they have a lumbago, we should consider all the various conditions that he may have and be able to make a correct differential diagnosis.



OSCILLATORY DESICCATION IN THE TREATMENT OF ACCESSIBLE MALIGNANT GROWTHS AND MINOR SURGICAL CONDITIONS.

A NEW ELECTRICAL EFFECT.*

BY WILLIAM L. CLARK, M.D., PHILA, PA.

There has been introduced to the profession within recent years several new methods for the treatment of lesions of various classification, occurring in the skin and accessible mucous membranes, which appear to have been very valuable, and in skilled hands, even revolutionary. Up until within a few years excision, cautery and chemical agents were the only means at our command for treating neoplasms, but since the advent of the x-ray, radium, electrolysis, ionic surgery, liquid air, carbon-dioxide snow and fulgeration, new fields of possibility have been opened to the progressive physician. A complete discussion of the merits of said agencies would be superfluous, as you are all doubtless conversant with the facts from the perusal of medical literature, or from experience. We are all agreed that there is no doubt of their value with certain limitations. Be it understood, then, that it is not my desire to underestimate or detract from these methods, but to call your attention to what I believe to be an improved technique, having to my mind certain advantages and perhaps more possibilities for good than other means available in the past.

The object of this paper is to show a means whereby tissue may be destroyed by rapid depletion of its fluid element. As applied to living animal tissue, heat effects range in degree from hyperæmia to burning. Somewhere between the two extremes there is a point, the effect of which is more than hyperæmia and less than burning, which may be called the desiccation point. The idea is to produce, control and sustain a degree of heat sufficient to cause rapid desiccation of the part to be treated, sterilizing it and converting it into an inert mass.

The term desiccation is used to more nearly express the effect produced, and to differentiate it from coagulation necro-

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sis produced by certain bacterial toxins, and the cooking caused by the application of the actual cautery. The cautery brought in contact with the surface of the body produces superficial searing and does not penetrate to any depth unless the cautery knife is plunged into the tissue. An example of this is steak broiled over very hot coals. The exterior is coagulated, and the interior remains raw. A less intense degree of heat has more penetrating power. Steak exposed to a slow fire is cooked throughout.

It is obvious that if destruction by desiccation were produced it would be more desirable than cooking by the cautery. The production and control of this effect in a practical way appeared to be a difficult matter, until a series of experiments with electric currents of high potential paved the way, and finally demonstrable evidence is at hand that an effect which appears to be desiccation of living tissue is not only possible, but subject to such control that morbid tissue the size of a pin point may be destroyed without infringement upon the normal tissue, as well as a growth of large size. This may moreover be done with one application, even though of considerable depth. A blood-vessel may be desiccated through without spilling a drop of blood.

Desiccation is obtained by a specialized, true oscillatory high frequency current, concentrated to a very fine metal point, and delivered in sparks of great frequency through an air space to the tissue. The principle of resonance as employed in wireless telegraphy is here utilized. The first experiments were with the induction coil, with the usual accessories for giving the high frequency current, but this current has been discarded as impracticable on account of the necessary interruptions and irregularity of discharge. Experiments with the oscilloscope shows this irregularity.

Fulguration as practiced at home and abroad for several years is obtained from the coil, and has its value, but it is not desiccation, the thermic degree being too high, and the impact against the tissue too severe.

The static current was next tried, which theoretically appeared to be ideal, on account of its smoothness of flow and absence of interruption and magnetic lag, giving what is known as a circuit of free oscillations, but the output of the ordinary machine was not sufficient for the effect desired.

A static machine of large output was procured. A 5 H. P. motor was used to drive 12 revolving plates of special construction for strength and durability, capable of 2,000 revolutions per minute, giving about twenty times the output of the ordinary static machine. By varying the size of Leyden jars and resonators all thermic degrees were obtained, from hyperæmia to cauterization. I experimented with my own hand for the milder effects, and with an ordinary cake of soap for higher degrees of heat. A balance was struck when it was possible to desiccate a piece of soap through a piece of paper without charring or discoloring the paper, and by extracting the plug and crushing it between the fingers it was pulverized. The soap immediately surrounding the desiccated areas was very wet, as it could not evaporate on account of the paper and condensed on the soap. When no paper was used, small droplets condensed upon the surface of a small mirror held in close proximity. It was found that the same effect was obtained with raw liver and potato. This seemed good proof that the exact degree of heat for desiccation was attained, which could be sustained without increasing the degree and without danger of burning. Small warts and moles were next successfully treated, after which I became more pretentious and cautiously applied it to epithelioma, exuberant granulations, cutaneous pigmentations, hemorrhoids, tattoo marks, acne pustules, x-ray keratosis, lupus and one case of bladder papilloma, aided by the catheterizing cystoscope. Its applicability in various other conditions will suggest itself. By slightly increasing the intensity of the current and bringing the metal point in closer contact, a destructive effect may be produced through fluids, as is necessary in the case of tumor of the bladder. The technique with observations upon the primary and secondary reactions, with the probable reasons for such cause and effect, are as follows:

A static machine of large output is used (3 to 6 milliamperes) with a pair of field regulators which have been devised to give instant and perfect control of the current, even when the speed of the revolving plates is high, which can be regulated at will without interfering with the speed of the plates. The accessories are Leyden jars, the capacity of each being .00042 M. F., used in connection with a resonator attuned to the capacity. One end of the resonator coil is grounded. It

makes no difference which end, it being a true oscillatory current, therefore no polarity and no electrolytic action.

A metallic instrument with a fine point is attached to an insulated handle with a contrivance for make and break, and is also attached by a wire to the other end of the coil. The monopolar method is employed. The resistance or spark gap is regulated to a point which is known as "critical resistance," which can be determined by the characteristic appearance of the discharge. The speed is regulated until the machine generates $2\frac{1}{2}$ to $3\frac{1}{2}$ milliamperes of current, more or less, depending upon the effect desired.

A discharge from a metal point against a target of tissue will cause an immediate change in the tissue, which is apparently desiccation, the penetrability depending upon the time of exposure and regulation of resistance or spark gap. It is possible with this current to destroy growths of large size and great depth with one application, if this seems desirable, or it may be accomplished in a number of different sittings. There is an immediate blanching of the tissue under treatment if the lesion be dry, or a blackening if it be open with oozing of blood, followed by a characteristic shell-like aspect.

Complete or partial desiccation depends upon the time the discharge is sustained. There is more or less of an inflammatory reaction beneath and surrounding the desiccated zone on account of the heat and traumatism, which is observed wherever there is a foreign body in living tissue. This is desirable, as it promotes a positive chemiotaxis. It is possible to remove the crust by using a little force immediately following the treatment, but it is best to wait two to five days, when it may be removed by gentle prying with a groove director, or it will loosen and drop off itself. The crust acts as a natural dressing and promotes a lymphorrhea between the healthy tissue underneath and the crust. In most cases when the crust comes away regeneration is well advanced, repair having taken place beneath the crust. Treated now by ordinary surgical means complete repair is rapid. I believe this is due to sterilization and probably migration of an excess of leucocytes to the part.

In from one to three weeks, depending upon the depth and size of lesions, granulations have filled up the depression. Depending upon the character of the lesion in regard to its size

and depth, new skin, scar tissue or a combination of both has formed. This is from macroscopical appearance only.

The cosmetic effect is good after the slight redness has faded away. When the area is large and deep there may be slight bleaching, as the skin pigment is destroyed. As a rule

FIG. 1—CASE I.

no anæsthesia is required. A few preliminary short flashes is usually sufficient to blanch and anæsthetize the nerve endings, so that the subsequent treatment is bearable. In very hypersensitive individuals local anæsthetic measures may be employed, but I make it a rule never to use a needle where there is a suspicion of malignancy. The cataphoric method

of diffusing a 4 per cent solution of cocaine is satisfactory. Recently a 1 per cent. solution of quinine and urea hydrochloride was used with success. Nitrous oxide may be employed, as the time required for desiccation is short. I found this necessary in two cases of multiple x-ray keratosis where extreme hyperæsthesia existed. To give an idea of the length of time required for desiccation, a section of tissue $\frac{1}{4}$ inch square may be depleted within the fraction of a minute. The rapidity of action seems to be directly proportional to the density of the tissue. Mucous membrane responds quickly, while a calosity requires a longer exposure.

The results of my experience with 317 lesions in 78 patients has made me feel that this preliminary report is justified: epithelioma 15, lipoma 2, pigmentations 12, granulating ulcerations 3, hemorrhoids 12, tattoo marks 4, acne 10, x-ray keratosis 58, chancroids 4, condyloma 10, bladder papilloma 1, lupus 4, moles 60, and verruca 122.

The following three cases were referred by Dr. Samuel F. Walker, of Philadelphia:

Case 1. E. W. Female. Age 48. Ulcerated growth, size of egg, of five years' standing, angle of right scapula. Diagnosis: epithelioma. Desiccated May 16, 1909. In five days slough came away. Ulceration healed in two months. Area slightly bleached. No recurrence to date. Twenty-one months since treatment.

Case 2. E. K. Female. Age 65. Rodent ulcer size of twenty-five cent piece, middle posterior surface right thigh. Twenty years' standing. Desiccated May 14, 1909. In three weeks new skin had formed, and it has not opened up since. Twenty-one months since treatment.

Case 3. J. W. Male. Age 85. Epithelioma left temple size of half dollar. Ten years' standing. Desiccated May 16, 1910. Slough came away in four days. New skin had formed in three weeks, and patient discarded a covering which he had worn for several years.

I have learned recently that there is a slight recurrence in the center. Patient living out of town, and on account of advanced age unable to return to office. I may say I desiccated superficially in this case; had I gone deeper I think there would have been perhaps less chance of recurrence.

Case referred by Dr. W. C. Hollopeter, of Philadelphia:

Case 4. M. S. Female. Age 86. Large epithelioma springing from the median line just above the nose, well back on the scalp to the middle of the temple back over the eye. Granulating surface the size of a large hand. Intense odor and much pain. Desiccated whole area, one application, July

FIG. 2—CASE 1.

8, 1910. This was done with the idea of palliation, and Dr. Hollopeter reported to me that the odor and pain was much lessened. She did not return for further treatment.

Case referred by Dr. Albert Parke Good, of Philadelphia:

Case 5. A. F. Male. Age 43. Epithelioma on nose 1 by $\frac{3}{4}$ inch in size. Two years' standing. Desiccated October 5,

1909. Entirely healed in three weeks with practically no scar. No recurrence sixteen months after treatment.

Case 6. G. H. Male. Age 40. After irritation to his lip from constant cornet playing since boyhood, a small keratosis appeared about three years ago on the mucous membrane of his lip, slightly to the right of the median line.

It gradually grew to the size of a pea, deep into the tissue and become hard and painful. Unquestionably, in my opinion, a malignant growth. Desiccated March 16, 1910. In three weeks there was perfect healing. No recurrence to date—eleven months after treatment.

Case 7. R. W. Male. Age 38. Four large protruding internal hemorrhoids. Intense spasm of sphincter-ani. Satisfactory anæsthesia by ionic diffusion of cocaine. Good exposure with speculum of rubber with wide longitudinal groove. Desiccated February 15, 1910. Ulcerations healed rapidly. Rectum returned to place. Spasm disappeared. Last examination three months ago; result satisfactory.

Case 8. E. V. Male. Age 50. Desiccated large mole with flat base exactly on the margin of the upper eyelid, leaving no scar, nor the slightest suspicion of contracture.

Case 9. W. F. Male. Age 25. Tattoo mark of an eagle the size of a small hand on the forearm. Desiccated whole area one application. Kept moist for several days with bichloride solution, when I was able to easily curette every vestige of ink away. In two months a combination of new skin and scar tissue had formed. At the present time there is some irregularity of surface and slight bleaching of the skin. In two small tattoo marks previously treated the result was almost perfect.

Referred by Dr. Edward Martin of Philadelphia, and treated in conjunction with Dr. B. A. Thomas of Philadelphia:

Case 10. I. G. A. Male. Age 65. Inoperable papilloma of the bladder size of a hen's egg near the trigone. First symptoms appeared eight months ago and bleeding commenced, which was very profuse and appeared at each evacuation of the bladder. He became very weak and anæmic. By using a catheterizing cystoscope Dr. Thomas was able to pass an insulated wire through the instrument, the bladder being inflated with boric acid solution. The wire could be perfectly controlled and brought into contact with any part of the

growth desired. First operation October 1, 1910. Treatment averaging two weeks apart. Bleeding very much diminished after the first treatment, and entirely ceased after the second. Papilloma rapidly decreased in size, and at the present time is no larger than a small marble. Patient has recovered health and strength and is attending to his business.

I shall insert here a history of multiple x-ray keratosis and epithelioma, written of his own case by a well known New York Roentologist.

Case 11. Age 39. "Began Roentgen ray in 1896. In 1897 small keratosis appeared on left hand. I never had any acute burn of the skin, but the condition resembling senile keratosis progressed steadily until about three years ago.

"During this time various methods of treatment by ointments, arc light, incandescent light and lotions were tried without any benefit. A very few keratoses were removed by salicylic acid collodion. By 1907 three or four of the keratoses had broken down and become ulcerated, and refused to heal under ordinary methods of dressing. At this time 13 excisions were made by Dr. A. C. Porter of Boston, and the areas were skin grafted. Two of the ulcers excised proved to be epithelioma by microscopical examination. All of the grafts grew well in place and recovery was very satisfactory. In the spots treated in this way there was no recurrence, except at the margins of the grafts, three or four of which developed new keratoses at the margin. During the next two years a number of keratoses, probably 20 or 30 were removed by freezing with liquid air and with carbon dioxide snow by Dr. H. H. Whitehouse of New York. This treatment removed most of the recurrent keratoses at the margin of the skin graft, and a few others that were isolated. This treatment although very painful, in the case of the areas which were near the phalanges, and especially those over the finger joints, was very satisfactory. A few spots recurred, but these were readily controlled by a second freezing. The cosmetic effect of the freezing was perfect when the areas treated were surrounded by healthy skin, and was very satisfactory in all cases. The treatments covered from two to six spots at each sitting. The duration of the treatment of liquid air or carbon dioxide snow was from 10 to 40 seconds. The time for complete healing averaged about two weeks.

"On June 3, 1910, about six were treated by Dr. William L. Clark of Philadelphia, and these had entirely healed over in about two weeks, the reaction and the end result being very similar to that obtained with the freezing. This method has the advantage that it can be applied in certain situations where it would not be practicable to apply the pressure necessary for the freezing. The condition of the hands was accompanied by a hypersensitiveness, which made the application far more painful than it would have been with normal skin. It was therefore decided after successful outcome of these preliminary treatments to apply the same method of treatment at one sitting to every keratosis on the left hand. Under general anæsthesia by nitrous oxide gas, on June 18, 1910, twenty-seven of these areas were treated within a period of four minutes. After five weeks every one of the lesions treated were healed up satisfactorily."

The foregoing will serve to give an idea of this destructive agent. I do not deem it prudent at this time to make any claims of permanent cure in cancer, although the freedom from recurrence of from one year to twenty-one months in several cases has made me hopeful. What I do wish to claim and impress is, that there is no doubt that accessible growths may be destroyed in an easy and refined way, and that desiccation should be adapted as a valuable addition to our armamentarium used alone or in conjunction with surgery.

The following experiments were performed to prove the sterilizing property of desiccation in the Pepper Laboratory of the University of Pennsylvania by Dr. B. A. Thomas: Two cultures taken from ulcerating carcinoma of pharynx prior to treatment show streptococcus pyogenes and *M. aureus*. Two cultures taken from same identical area immediately after treatment showed no growth. This was verified in the case of two infected leg ulcers in the Laboratory of St. Agnes Hospital by Dr. P. H. Wood. *Staphylococcus pyogenes* was found before treatment, and there was absence of bacterial growth after application. In one of the latter cases a cover glass preparation was made from the ulcer after treatment for a study of cell changes, and microscopical examination revealed nothing but disintegrated epithelial cells, showing the life of the cells was destroyed without entirely losing their identity.

Malignant growths may be destroyed without opening blood or lymph channels, thereby preventing further metastasis, or the inoculation of healthy tissue in adjacent parts. In cancer of the breast, where there is involvement of the axillary or cervical glands, a surgical procedure is indicated on account of inaccessibility of the involved structures, but on first appearance of recurrence there would be a great possibility of arresting activity. In cancer of the cervix I believe it to be more desirable than the curette and cautery. It is also destructive, styptic, deodorant and penetrating, and can be done with a minimal degree of danger and discomfort, and I believe it might offer a chance of cure if taken early. It is very effective in exuberant granulations, and there is reason to believe that it would be effective in trachoma. Sluggish ulcers may be stimulated to repair.

It simplifies the treatment of hemorrhoids and other neoplasms of the mucous membranes. Employing the endoscope as an aid, cavity lesions may be successfully treated. Its applicability in the bladder has been shown, and I believe the future will show it to be possible to apply it deeply into the rectum, the interior of the uterus, the throat, the esophagus and even the stomach.

In warts, moles, pigmentations and in certain other cutaneous lesions, the destruction is a simple matter, and the cosmetic effect good. Old pus sacs may be entered and destroyed, as in pustular acne, furunculosis, carbuncles, etc. Sluggish ulcers may be stimulated to repair.

Fulguration produces its effects by a coarse kind of mechanical superficial charring, while oscillatory current desiccation produces a refined penetrating devitalization by drying, and possibly some biological effect in addition, which I cannot define at the present time.

My work up to the present time would appear to justify the following conclusions:

A current from a static machine of large output with properly attuned accessories, when applied with correct technique and care, is capable of producing a superficial or a deep destruction of tissue by desiccation or rapid depletion of its fluid element, which breaks up and disintegrates the cells.

It has sterilizing, deodorant, styptic and stimulating properties.

This specialized current has no particular affinity for abnormal tissue over the normal, but it is a simple matter to keep the destruction well within bounds on account of refinement of control.

It is operative in all accessible lesions where destruction is desirable, and works from without inward.

Living tissue is destroyed by this means almost as readily as dead tissue (raw meat).

The rapidity of action appears to be directly proportionate to the density of the tissue.

1809 Chestnut Street, Phila., Pa.

Discussion.

Dr. G. Betton Massey of Philadelphia. I think it is evident to us that Dr. Clark has something here somewhat different from the so-called fulguration, a current produced by different apparatus, and with different physical conditions and biological results. Those abroad who want to duplicate these results, however, should beware of trying it unless they have American static machines, as their machines would not produce it. I believe that I was one of those who expressed the opinion that fulguration was electrolysis in its final analysis. I am inclined to believe that that was incorrect, that we do have conditions here other than electrolysis, possibly drying, burning, etc. In considering the value of the method in the treatment of growths, it appears to me to occupy a position somewhat midway between the x-ray and cataphoresis or ionic surgery, having certain advantages in a few cases, but from my large familiarity with the ionic surgery I do not see a very extensive advantage, though a very definite one in one particular line. That is this: Given an old man or woman, over seventy-five or seventy-eight years old, with a proliferating growth on the scalp, I think we have in this method, or in fulguration, a very valuable one, and superior to the cataphoric in this particular, that never mind how insensitive the surface of this growth may be in an aged person the minor cataphoric method transmits enough current through the body to make him dizzy. I have had to abandon the minor method, and the major method could not be used on account of the age. But as for these little warts, it is not necessary to get an eight hundred dollar machine to treat those, when a man has got a forty dollar galvanic battery in his office. All he needs is a little bit of zinc, a fine wire and some mercury.

Dr. William B. Snow of New York. An important point in this paper is the discrimination between the fulguration or effluviation of Riviere, and a method which Dr. Clark asserts

does not produce the same uneven heating or burning effect. The writer of the paper has very thoroughly brought out that point, that instead of burning the tissue, the desiccation or drying that takes place is different from the other process. If this view is sustained it creates a distinctive method of making this form of application, in contradistinction to the method which has been used with any sort of high frequency apparatus or coil. It is a very fine discrimination, and one that in its nicety is not appreciated by those who are not familiar with the two methods. But I am sure any of you who will investigate will see the reason for the discrimination in favor of that method. We are able to destroy these affections by other methods. I do not quite agree with Dr. Massey that the constant current leaves just as clean and excellent result in cases of x-ray keratosis. I do not believe that it cleans up the tissue so well. It is certain the x-ray keratoses are most difficult to cure, and to have had the result reported is very gratifying. I am personally obliged to Dr. Clark for the new departures he has made and the work he has done, because this seems to be an effective way of getting at many conditions. I do believe, however, that we can obtain by different manipulation and arrangement practically the same effects with a current of less amperage. For instance, I believe if you use a direct d'Arsonval instead of an Oudin current you may obtain the same effect. It is a question of adjustment, a little nicety of arrangement. In his apparatus and technique he has it perfected. I believe also that practically the same current can be derived by a little different arrangement and get the same result. With his own apparatus and arrangement however he is certainly prepared to do the excellent work of the kind he described.

Dr. J. C. Walton of Richmond, Va. I want to thank Dr. Clark for his paper. I think it is an epoch making paper.

Dr. Henry E. Waite of New York. I would like to know what Dr. Snow means by the direct d'Arsonval.

Dr. Snow. I mean by placing a part of the patient in the *direct* path between the two poles of the d'Arsonval circuit by putting one electrode on the body in one place and applying another electrode at a place opposite.

Dr. Waite. There is no such thing as a direct d'Arsonval.

Dr. Snow. That term is in common use and correct. The d'Arsonval current may be used by this direct method or by the indirect. If the patient is seated on the auto-condensation couch, with one side of the circuit connected to the condenser plate beneath the cushion and an electrode applied from the other side, it is indirect, whereas if you pass the current as I state through the patient, it is properly designated the direct d'Arsonval current. It has no reference to the constant current.

Dr. Waite. The paper is a most valuable paper, and brings forward points that should be followed out. There are a great many who in speaking of high frequency do not know the difference between the d'Arsonval and the Tesla. There are apparatus sold for twenty-five dollars and carried around by doctors, which are called high frequency apparatus and said to be equal to any static machine made. You all know better. You will also find good men's names connected with them. As a result, the men who buy these do not get the results, and they think the other men are either visionary or lying.

Dr. Frederick deKraft of New York. Dr. Clark has certainly given a very extensive explanation of his method. I think his method of utilizing the hot spark for the destruction of growths is certainly worthy of imitation. Whether or not there is such a difference between a hot rapid spark from a static machine or from an up to date coil is a question. It simply comes down to the length of the spark and the rapidity of the oscillations. I grant that with a static machine of the type that Dr. Clark is using we are getting a very much higher frequency of oscillation than it is possible to get with any coil. It may be possible that he is getting something different there than could be gotten with a coil, and that there is less disunion or electrolytic effect. Possibly some of action of the current is due to the constricting effect of the current on the blood-vessels. This constricting effect is lasting. It is not momentary as any other constricting effect would be from another source. It may be that this shuts off the blood supply from the cells and allows them to die out.

Dr. S. St. J. Wright of Akron, Ohio. Can the Doctor tell when he gets deep enough, and would he be willing to attack an ulcerated carcinoma of the breast in the female?

Dr. Clark in closing said: Refinement in this work is a matter of technique and experience. One must learn by doing. I was uncertain at first how far to go to get the desired penetration. The first lesion treated was a large mole on the chin in which there was over exposure and needless destruction. Fortunately the cosmetic result was good notwithstanding. The next was a lipoma situated over the sternum. At that time a small vacuum tube with a platinum tip was used, and when the growth appeared to be only partially destroyed, the tube punctured. It being the only tube on hand, the patient was asked to come back in three days that the destruction might be completed. Upon his return it was found that the growth had entirely sloughed away. Since these and other experiences, it is possible to determine with reasonable precision about how far to go in a given time with a certain frequency and length of spark.

I have had no experience with ulcerated cancer of the breast, as there is usually extensive metastasis. I would be inclined

to refer such a case to the surgeon. It is my belief, however, that it would be an advantage to desiccate the raw area after extirpation, with the hope of sterilization, destruction of points untouched by the knife, sealing of blood-vessels, and the prevention of further metastasis.

Regarding the bi-polar d'Arsonval current (which is, in other words, thermo-penetration, latterly called by some diathermy), it can be said with assurance that it is impossible by this means to produce desiccation as obtained by the balanced unipolar Oudin.

It has been my privilege to experiment quite extensively with this current, and it has been found that the necessary close contact of electrodes renders impossible rapid evaporation of the fluid tissue element, consequently desiccation is not produced. The effect is cooking pure and simple, which is all that is claimed for it by the workers at home and abroad. It has not yet reached the stage of development for safe and practical use in surgery, other than with small superficial lesions, and with these the desiccation method is more subject to control, as to area destroyed and depth.

The property of the bi-polar d'Arsonval current in elevating the temperature of the tissue between the poles, which can be controlled by varying the size of electrodes and the strength of current, should give it a wide applicability in certain systemic conditions, such as rheumatic joints, etc.

It is gratifying to hear this discussion, and that the distinction I wished to convey is appreciated.

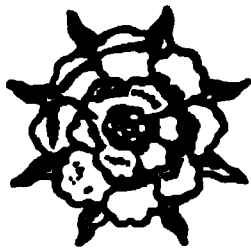


PHOTO-THERAPY.*

BY F. BARRETT, M.D., WESTBROOK, ME.

Being a physician in general practice and doing special work and also trying to carry on a small hospital makes me a man of action rather than theory, so I will not enter into the physics of light and devote but little time to the physiological theory of light. You will better understand the reason for my failures as well as my successes if I mention the apparatus with which I have carried on my work for a number of years. The Ultra-violet lamp manufactured by Swett & Lewis excited by the Kinraid coil. A six glower Nurnst lamp in a parabolic reflector, which I call the Concentrated White Light, and also the red light. It tests 840 c.p. under a $\frac{1}{4}$ circle shade. I have an electric light bath cabinet with mirror reflectors with thirty-six 32 c.p. lights. A blue light bath which is large enough to cover the trunk and which contains two 32 c.p. and four 16 c.p. lights, and one 32 c.p. blue light in a parabolic reflector.

The present accepted theory of light is the undulatory theory, or in other words, vibration; and according to the rate and length of the wave, we have motion, electric manifestations, sound, heat and light. The whole universe, also health, sickness, and death are only different rates of vibration. In our opinion health is harmonious vibration, sickness is discordant vibration, and death is cessation of vibration. Returning to the visible spectrum we have at the red and orange the slowest vibration and the longest waves and they possess little or no chemical properties. To the violet, where we have the shorter wave and more rapid vibration. We can go still farther at either end of the spectrum till we reach the invisible, the infra-red where we get only heat, to the ultra-violet hyper-ultra-violet Becquerel Ray and Roentgen Ray, which are manifestations of energy of unknown wave length and velocity, and are made manifest by their power to cause certain minerals to fluoresce and phosphoresce, and also by their effect upon animal tissue.

The physiological effects of light energy may be given as follows, beginning first at the lower end of the spectrum.

*Read before the New England Association for Physical Therapeutics.

Red light is an irritant and cerebral excitant, as shown by the following case: Miss B., age 23 years, of a lymphatic temperament had been in semi-invalidism since babyhood; could do but little work of any kind without becoming very tired. I had been giving her electrical treatments with benefit and thinking that she might become able to wash a few dishes, I gave her a treatment with the red light and four days afterward she reported that she did not want another treatment with the red light for she was unable to sleep upon the night of the treatment and was so nervous the next day that she could not keep still (she did not say that she had washed any dishes, however).

In the orange, yellow and green we have heat and light, are irritating and stimulating, as is proven by the following cases treated by the light bath.

Mr. B., a teacher of chemistry, with aphonia due to uric acid diathesis (I do not recall the percentage of uric acid, but it was very high), after two light baths of ten minutes each with thirty-six lamps of 32 c.p. and temperature 140 degrees in the cabinet, we have very free transpiration, the uric acid became normal and the aphonia ceased.

Case 2. Mrs. S. had muscular rheumatism for nearly two years and for two months was unable to go upstairs, or to dress or undress herself. I gave her a light bath twice each week from ten to fifteen minutes with cabinet temperature of from 120° to 140° F. She was under treatment eighteen months and though not entirely cured was able to do her house work and walk one mile to my office.

Case 3. Mrs. S. had chronic indigestion due to torpid liver and some jaundice. She was given light baths over the body and the static wave current over the liver for four treatments, which gave so much relief that she was free from headaches and indigestion for a number of months, and would have continued treatment until cured but could not afford it.

Case 4. Miss B. having anæmia was given the light bath at a temperature of 120° F. for eight minutes followed by alcohol rub. After much improvement she stopped treatment to go to the seashore.

Concentrated white light: I have chosen that term because it expresses more fully than any other the true character of the light, from a six glower Nurnst lamp. It is, as you all know,

an open lamp; that is, it is not inclosed in a glass globe as is the ordinary incandescent lamp.

Though it possesses some ultra-violet rays, it has no glass to absorb it, so that the patient gets the full benefit of all the rays that it generates. Being inclosed in a parabolic reflector it concentrates all rays to the part being treated. Having a candle power of 840 it gives out a great amount of heat and radiant energy. Its cost of maintenance and its consumption of electric current is much less than of any incandescent lamp of the same or even smaller c.p.

Case 1. Mrs. B., age 35, gave a history of loss of flesh, cough for one year and some expectoration in the morning. Two months before taking treatment she had a severe pulmonary hemorrhage, and for two weeks before coming to me she had a second and more severe hemorrhage than the first. She then became frightened and felt that it was time something was being done. Upon physical examination there was found an increased rate of pulse but the temperature was normal with signs of the early stages of tuberculosis. A Radiograph showed a small cavity near the apex of the left lung and quite a number of small tubercles. I began treatment in October, 1907, giving treatment every other day for three months for ten minutes on the anterior and five on the posterior walls of the chest at each treatment, and twice weekly for six months more when she was dismissed as cured, and there has been no recurrence of any symptoms of the disease.

Case 2. Rheumatic myalgia of the lumbar muscles. After trying the static modalities with no benefit I administered the concentrated white light for fifteen minutes, and after six treatments the patient was able to go to work.

We get the most benefit in various forms of neuritis, for as a tonic it is par excellence. It gives that feeling of hunger and well being.

Case 3. Miss B., having no occupation and though well developed was anæmic, with scant and irregular menses, obstinate constipation, and became easily tired. I began treatment with concentrated white light, giving ten minute treatment on both the anterior and posterior parts of the body. When menstruation and digestive symptoms became normal there was a marked improvement in her general health, although

not cured when she discontinued treatment to go to the seashore.

The treatments were given twice a week over the whole anterior and posterior parts of the body for ten or fifteen minutes on each side.

Case 4. Mr. M. worked in the box department of the paper mill and was taken with severe brachial neuritis of the left arm. I tried various static modalities with little benefit, and began the concentrated white light with more relief, when he became discouraged because of the expense, but was so much relieved that he was able to return to work.

Case 5. Miss M. had been ill with spinal tuberculosis which resulted in a psoas abscess which discharged into the bowels and bladder. The tubercular process extended to the peritoneum. I treated her with various electrical modalities, then with the x-ray, and finally with the concentrated white light. After one year's treatment she was pronounced cured of the tubercular process by five different physicians.

I might mention a number of other cases but these will, I think, suffice to demonstrate its value.

Blue light: We consider the blue light one of the most interesting of the photo-therapeutic modalities; interesting, because it is not as well known and has not been used so much as other radiant energies, but we believe it has a great future, after it becomes more thoroughly understood. It is both analgesic and sedative, as is well illustrated by the following cases:

Mrs. M., aged 60, had diabetic neuritis of the spinal nerve; for two years all the rest she could get was from nine to ten and sometimes eleven o'clock at night, and the rest of the night was spent sitting in a chair with the back against a radiator. The percentage of sugar in the urine was quite large, I think about 6 per cent. I had the body bath prepared with two 32 c.p. and four 16 c.p. blue bulbs. It was applied over the whole length of the spine for fifteen minutes, with the result that she went to sleep during treatment. After the first treatment she slept till midnight, when it was reapplied for fifteen minutes more when she slept till five A.M. Only twice after beginning treatment was she obliged to sit up part of the night and that was during the absence of the nurse and at the beginning of the treatments. She was under treatment

six months, although neuritis disappeared at the end of four months, and for two years previous to her death, which was due to heart disease, the urine had been entirely free from sugar.

Case 2. Mrs. P. was taken to our hospital August 1 with the following history, that three weeks previous she had given birth to a seven months child which had been dead at least two weeks. I understand that the case was instrumental and the os dilated manually. A few days after childbirth the left knee became swollen and painful and after one or two days more the pain extended the whole length of the leg. She presented the following condition when admitted to the hospital: much tenderness through the whole pelvic region, severe sciatic neuritis (condition due to sepsis), pulse 96, temperature 103.5° F. at six P.M. She was given the blue light bath over the sciatic nerve; at nine P.M. the temperature was 103.8° and pulse 100; was given another blue light bath and at 3.15 A.M., August 2 the temperature was 100.4° and the pulse 82. The blue light was given for thirty minutes twice daily for twelve days with high frequency vacuum tube discharge in the vagina, ten minutes every day for one week. After two blue light baths the temperature dropped to 100.4° F. and in four days to 99° and normal and remained so. She was dismissed August 29 free from pain and with only slight weakness in the left leg.

Case 3. A young man came with what promised to be a good sized carbuncle on the right forearm. The base of the carbuncle was about the size of a silver dollar with no symptoms of suppuration having taken place. The blue light bath employed from two 32 c.p. lamps for twenty minutes and he was requested to report next and have it lanced. I did not see him again, however, for two weeks when I met him on the street and asked him why he did not report he said that the next day after the blue light treatment the pain had disappeared and the swelling was very much better and in a few days had disappeared. I could mention a number of cases of furuncles of the face and neck which were cured in from two to four treatments of fifteen or twenty minutes each. When suppuration had taken place the necrotic tissue was easily removed after a second treatment. Pain and swelling from ulcerated teeth are quickly relieved. I could enumerate a number of

other interesting cases treated with the blue light, but these will suffice to give you an idea of its large range of usefulness, and yet more is to be learned of this valuable modality.

Ultra-violet rays. Thanks to the immortal Finsen, who has taught us so much of this modality that little need be said of its physical and physiological properties. I shall only state that I have treated with complete success three cases of lupus vulgaris and one severe case of lupus erythematosus, the latter case having a suspicion of specific disease. I will add that the x-ray was also used in these cases.

Progress in Physical Therapeutics.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M.D.

X-ray Treatment Graves Disease, Schwartz, Arch. D' Elc. Med.

He claims that radiotherapeutic treatment of Graves disease has as high a percentage of success as the surgical method, and has none of the danger nor pain incident to the operation. He insists that the x-ray has in exophthalmic goitre a distinct etiological basis, one of their general characteristics being the power of diminishing glandular secretion. He finds after the irradiation has been commenced there is a marked improvement in the nervous symptoms, in fact, immediate improvement in all symptoms; many patients putting on flesh rapidly at from 12 to 17 pounds per month. The ophthalmos is usually considerably diminished, though this is ordinarily the most obstinate symptom, especially in long standing cases. In forty cases observed by him there was an increase in weight in 26, the pulse rate was reduced in 36, there was relief of nervous symptoms in every case, and of the ophthalmos in 15 after 3 months of radiation.

The improvement is constant for the nervous symptoms and almost so for the tachacardia, and he quotes Kraus, who claims that when the tachacardia has not been present for a certain time the Graves disease may be considered cured, although other symptoms may remain. Therefore on these grounds the author claims 90 per cent. of cures for radiotherapy, which is equal to operative results if not superior. He calls attention to the fact that the skin of the cervical region is more than ordinarily sensitive to the x-ray, and in

Graves disease this sensitiveness is so increased that too strong doses must not be given. He irradiates the neck, first in the anterior direction, then in the left and right direction, with rays filtered through glass 2 mm. in thickness, the dose one-half Sabourand, or two kalons of S. F. radiometer. He gives one of these exposures weekly, which should be kept up for six months.

Radiotherapeutics of Fibroma Uteri, La Press Medical.

In many respects the high hopes that were raised in the beginning for the use of x-rays have not been realized in the treatment of malignant and non-malignant tumors. Therefore it is very interesting to find an author who claims that a definite cure of uterine fibroids can be obtained by means of the x-ray, provided the applications are made before or in not less than seven years of their growth. H. Bordier states that this is the case according to his experience. The treatment may be applied in such a way as to give no results, while if the technique is followed out as given by him a complete cure may be obtained. Bardachzi obtained a decrease in size, an arrest of hemorrhage, and a rapid improvement in the general condition. The rays cause the cells of the tumor to atrophy, and decrease of volume occurs even when menstruation continues. In some cases the fibroma entirely disappears and the menses continue; this occurs in young women especially, where it is not desirable to castrate or remove the uterus where the tumor is small in size. The best effects are obtained in small fibroids of recent growth. Good results are also to be expected in tumors reaching as high as the umbilicus provided they have been present less than seven years. Small fibroids of any age are favorably affected by the rays if they are accompanied by much hemorrhage. In recent fibroids the regression occurs in about five months, and the menses grow less and gradually disappear. In hemorrhagic fibroids the result is even quicker, atrophy occurring as soon as the Graffian follicles are affected. In fibroma older than seven years operation is to be preferred to the x-ray. The less potent rays are filtered out and the treatment is given, first over the two ovarian regions and then over the middle line of the abdomen at a point midway between the umbilicus and the pubes. Treatments are given every other day.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

Hydrotherapy in Tuberculosis.

In a recent article Heim (*Zeitschr. F. Tuberkulose*, Vol. XVI, No. 4) calls attention to the fact that during the progress of the malady, there occur toxins of the bacilli and that there are absorbed certain products of retrograde tissue metamorphosis, which stimulates the sweat glands of the skin through direct or reflex irritation of the sweat centers. It is the opinion of Heim that the noxious substances are eliminated by the sweating processes, although he has not been able to demonstrate with certainty their presence in the perspiration.

This contribution is of great interest to the editor of this department, who has for several years held the same opinion, based upon the careful clinical study of cases of tuberculosis in which sweating procedures and tonic hydrotherapy were employed. I have noted that where patients with this disease are treated by means of the arc lamp or incandescent electric light bath to the point of moderate perspiration, followed by the stimulating action of graduated tonic, that is, cold hydrotherapeutic measures, there is generally rehabilitation of the tissues followed by a cessation of the night sweats. Based upon my observations of these cases I have come to the conclusion that the cessation of the night sweats were brought about by the conjoint action of several factors, rather than the single one of elimination of the toxins acting upon the sweat centers. The circulatory condition of all tubercular cases is too well known to go into detail, but it may be incidentally mentioned that coldness of the surface, contraction of the surface blood-vessels and a lowness of the blood pressure are not uncommon accompaniments of the disease. The action of the electric light bath and tonic hydrotherapy is to not alone favor excretion by means of the sweating itself, but it floods the skin with blood, dilates the capillaries and after the cold application, maintains this in a state of tonic dilatation. The stimulation of all the glandular secretions, its powerful influence upon elimination by the internal organs, upon the intricate tissue and circulatory changes, result in a most marked improvement of the appetite, digestion and assimilation which takes place, and is usually followed by rosy skin and increased weight.

Heim's observances are interesting and bear out the clinical results obtained by physiotherapeutists in their treatment of this disease.

PHOTOTHERAPY AND DERMATOLOGY.

EDITED BY DR. HERBERT F. PITCHER.

The Editor of this Department most thoroughly agrees with an editorial in the *American Journal of Dermatology* on the *Value of Simple Diet in Acute Skin Affections*. The Editor maintains that diet in the treatment of skin diseases has a marked bearing on the success attending the dermatologist's efforts, in many cases being no less important than the chosen drug treatment. He claims the tendency oftentimes found among careless medical men to dismiss a limited or disseminated skin lesion with an application of either an ointment or a lotion, and a purgative, must be overcome if greater general success in the treatment of skin diseases is to be arrived at. Not enough consideration has been shown the subject of diet; notwithstanding its vast influence on the skin and the morbid processes that affect it.

He thinks that far too little attention has been paid to this important curative means, and that in certain acute inflammations of the skin a carefully chosen diet may be curative without the aid of drugs. Only in some of the larger institutions has regulated diet been enforced to show its powerful influence over disease processes. Of course, this benefit is along corrective lines, the conclusion that the disease in question was originally due to irregularities in diet being logically deduced from the relief and not infrequent cure resulting from the withdrawal of the usual dietary and substitution of simpler food agents.

The writer recites from a recent paper written by Bulkley and published in the *New York Medical Record*, that Bulkley himself was tormented with an acute inflammation of the skin for several years at the same time of the year. The eruption was upon the fingers of both hands and although resembling pompholyx, it was not clear that such was the correct diagnosis. Within five days from the inception the eruption gave rise to most annoying symptoms. Finally Dr. Bulkley placed himself on a diet of rice, bread, butter and water. He excluded everything else from his dietary. He used no external treatments but did continue a mixture of acetate of potash, nux vomica and quassia, which he had been taking as a tonic. Within twenty-four hours of the beginning of his treatment the tension, burning and itching were lessened and in another twenty-four hours the hands could be washed and wiped without giving rise to the great discomfort formerly experienced. In a week the condition had ceased. This experience with rice in acute inflammations of the skin points to its value as a corrective in nitrogenous accumulations.

Roentgen Rays in Skin Diseases.

Lowenburg (*Münchener Med. Wochenschrift*) claims that many of the harmful results following the use of the x-ray in diseases of the skin are due to lack of knowledge on the part of the operator as to the proper dosage. Inasmuch as it is not shown that the ray is parasitocidal, paracitocides must be resorted to in the cure of skin affections due to parasites.

The rays seem to exert a splendid influence in chronic and localized eczema, so much so that the writer recommends that they supersede all other forms of treatment in certain phases of the disease. Psoriasis responds kindly to small dosage but there is always the probability of recurrence.

Curative Action of Solar Rays (Archives of the Roentgen Ray).

Artault of Vevey, at the recent Congress of Physiotherapy, referred to the subject. In order to avoid prolonged exposures to the direct action of the solar rays, which are slow in their effects, he localizes the solar energy upon the region affected by means of an apparatus called the heliophore. This has the great advantage of increasing the curative actions of the solar rays, and allows us to utilize such and such radiations of sunlight as are known to be especially active on particular conditions, to the exclusion of all others. In this way he has treated with remarkable success all surgical tuberculous affections, certain forms of neuritis, and also eczema.

Some of his results obtained in cancerous cases seem to indicate a very rapid and permanently retrogressive effect.

Reflections from the American Journal of Dermatology:

"Rare or unusual cases of skin diseases are perhaps too much sought after by medical students or writers on dermatology. This is certainly a mistaken idea, as it, beyond all doubt, is most necessary to become well acquainted with the diagnosis, pathology and especially the treatment of the commoner cutaneous affections. The rarer ones are easily recognized, their pathology is never settled positively, and their treatment is an equal open question. The prime necessity nowadays is to find simple, good and efficient methods of treatment for eczema, acne and such affections."

SERUM THERAPY.

EDITED BY I. OGDEN WOODRUFF, M.D.

The Use of Bacterial Vaccines in Children's Diseases.

Howland and Hoobler, in a paper read before the American Pediatric Society, at the 8th Congress of American Physicians and Surgeons, 1910, report their experiences in the treatment of various local and general bacterial infections in children.

The classes of cases in which they used vaccines included staphylococcus, streptococcus, pneumococcus, gonococcus, and unusual types of infection.

In staphylococcus infection, both localized and general, apparently curative results were obtained.

The results in localized and general streptococcus infection were variable. No curative effects which could be traced with assurance to the action of the vaccine were noted, although some cases in both classes improved and recovered. Other cases progressed unfavorably despite the employment of vaccines.

In general pneumococcus infections, stock vaccines were chiefly used. As far as could be ascertained, they were without effect, either favorable or unfavorable.

In one case of infection with bacillus coli communis following a compound fracture of the leg followed by metastatic abscesses and necessitating amputation at the knee-joint, and in another infection with bacillus mucosa capsulatus, following erysipelas and attended by abscesses, recovery ensued after the employment of autogenous vaccines.

In gonorrheal cases chiefly of vaginitis, stock vaccines were employed. They think that though the vaccines may cause improvement in these cases, they are not curative.

Illustrative cases of the various types of infection are cited.

They believe that it is yet too early to decide the value of vaccines in general infections, inasmuch as there are no statistics available to show the result in many of these infections without such treatment. Heretofore the presence of the infecting organisms in the blood was determined only in those cases in which they were present in overwhelming numbers, and it is only recently that the milder grades of general infection have been recognized.

A Note on the Treatment of Rheumatoid Arthritis by Vaccines.

Bannatyne and Lindsay in the *British Medical Journal* for January 28, 1911, report successful results in certain cases of rheumatoid arthritis from the blood of which they have isolated micro-organisms. The organisms were grown on blood agar at a temperature of 35 C. The vaccines were autogenous.

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERIC DE KRAFT, M.D.

The Clinical Value of Diathermie. By F. Nagelschmidt
(*Deutsche Medizinische Wochenschrift*, Jan. 5, 1911).

There are separate and distinct effects to be noted. First, destruction and death of the tissues. Second, increased function and vitality. To effect the first we must heat the parts to the point of coagulation. To gain the second we heat the tissues so lightly as to make it barely possible to measure the increase in temperature. The first group includes the surgical uses. Theoretically tumors of any size can be coagulated. Practically, we make use but rarely of a deeper action than 1 or 2 cm. because of the necessity of avoiding injury of some important organ, a nerve, blood-vessel, a loop of intestine or a ureter. One layer is coagulated at a time, and removed by a dull curette before proceeding to the next layer.

This method enables us to do the smallest as well as the largest operations without the loss of any, or but little blood.

Angiomas of the mucous membrane, which might lead to severe hemorrhage and suffocation of the patient, can be destroyed without the loss of a drop of blood. In the case of infected masses such as a cauliflower growth of the cervix, or a hypertrophied tonsil filled with streptococcic pus, or intraperitoneal streptococcic glands, we can coagulate the tissue with its infectious contents, kill the bacteria and destroy the toxins and then remove the harmless sterilized mass. When a cancerous mass is operated on by means of the knife it is impossible to prevent the inoculation of freshly opened healthy lymphatics and blood-vessels with cancer cells.

One great advantage of a diathermic operation is the coagulation of lymphatics and blood-vessels making it impossible to disseminate the cancer cells.

Many cases which would be inoperable with the knife are still possible with diathermy: for instance, a carcinoma en cuirasse with hundreds of carcinomatous nodules spread over the thorax. In such cases it becomes possible to diathermatize the diseased parts and save the intervening healthy tissues. A point of importance to be noted is this:

If we apply a surgical electrode the coagulation occurs first in the immediate vicinity of the electrode.

Under the coagulated layer is another thoroughly diathermatized one. This is not heated to the point of coagulation. This layer presents certain features which are of very great importance for the medical uses of diathermy.

This tissue shows marked stimulation of all its functions. Glandular tissues secrete more strongly, capillaries are dilated, causing a prolonged hyperemia, at the same time an intense

lymphorrhœa occurs which washes away the toxins, bacteria and cancer cells.

Marked hyperemia of the tissues surrounding the field of operation together with great œdema and abundant serous exudation follows the operation.

This makes it next to impossible for even large wound surfaces to become reinfected. Secondary hemorrhages rarely occur. The cancerous cachexia disappears quickly.

The application of diathermy in the treatment of internal diseases is of possibly still greater importance. It is possible to warm the kidneys, the liver, the brain, in fact, any organ without injury to the skin.

Or we may cause a rise of temperature of the entire body by a generalized application. This warmth is transmitted to every cell, to every granule of protoplasm, to every molecule of the diathermatized tissue. This warming means an addition of energy from without and the production of a number of secondary effects.

Increase of metabolism, slowing of fermentative processes, increased functions. All this is accomplished not by the use of reserve energy stored in the body but by reason of the increase of energy which is brought into the body from without and distributed to the interior in immediately utilizable form.

We also have local hyperemia of long duration and arterial in kind.

Glandular organs show visibly in increased secretions, other organs show heightened functional activity.

We reorganize a marked effect on the general circulation.

The arterial tension is lowered, the amplitude of the pulse is slightly raised. The circulation is regulated, intensified. Œdemas disappear, in cardiac as well as renal affections, neuralgias, sciatica, lumbago, migraine, the lightning pains and crises of tabes are favorably influenced by the pain relieving action of warmth.

The antiphlogistic action is shown in pyorrhœa alveolaris in pneumonia and pleurisy.

Gouty joints are relieved of pain in a very few minutes and of swelling in a few days. Recurrences are postponed for a long time. Rheumatic and gonorrheal arthritis are favorably influenced.

Some cases of chronic nephritis were improved; fifteen cases of nervous asthma were treated, thirteen of these are free from attacks for two years.

In two cases the improvement was temporary.

BOOK REVIEWS.

LIGHT THERAPEUTICS. A Practical Manual of Phototherapy for the Student and the Practitioner with Special Reference to the Incandescent Electric Light Bath. By J. H. Kellogg, M.D., Author of "Rational Hydrotherapy," "The Art of Massage," etc. Member of the British Gynecological Society, The International Periodical Congress of Gynecology and Obstetrics, American and British Associations for the Advancement of Science, the Societe de Hygiene of France, American Society of Microscopists, American Climatological Society, American Medical Association, Michigan State Medical Society, Superintendent of the Battle Creek (Mich.) Sanitarium. The Good Health Publishing Co., Battle Creek, Mich., 1910. Price, \$2.50.

In this work Dr. Kellogg, who is so well known as an original investigator and student of physical therapeutics, has collaborated an array of facts and evidence of the value of radiant light and heat, and what he terms convection heat. He has shown the relative effects of heat and cold, and the employment of radiant light and heat in connection with hydrotherapy from his own personal experience and point of view. A very practical chapter is devoted to a table showing the physiological effects of heat and cold and the influences of both upon the various functions and parts of the body. When he calls attention to the different effects of what he chooses to call the chemical or actinic rays and the other rays of light, he seems to lose sight of the fact that luxuriant plant growth takes place under glass. In an illustration of the method of giving the sun bath, the author shows the patient lying before a closed window. The criticism made by the writer as to the negative effects of the high candle power incandescent lamp is hardly warranted and not in accord with the experience others, but is generally demonstrated to be superior to the type of lamp which the author illustrates so frequently throughout the work. He quotes authorities showing the remarkable effects of the actinic rays in destroying germs in water when exposed to sunlight, but states that these rays do not penetrate the living tissue, whereas the luminous and heat rays penetrate for several inches into the tissue. In the chapters on therapeutics he treats of the employment of light in various conditions to which it is adapted. The work is a valuable addition to the literature, containing in a condensed form a large amount of valuable information.

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MODERN TREATMENT, THE MANAGEMENT OF DISEASE WITH MEDICINAL AND NON-MEDICINAL REMEDIES. In Contributions by American and Foreign Authorities. Edited by Hobart Amory Hare, D.D., Professor of Therapeutics and Materia Medica, Jefferson Medical College, Philadelphia, Physician to the Jefferson College Hospital, assisted by H. R. M. Landis, M.D., Director of the Clinical Department of the Phipps Institute (University of Pennsylvania); Visiting Physician to the White Haven Sanatorium. In two volumes. Volume I. Illustrated. Lea & Febiger, Philadelphia and New York.

This work has been prepared with great care, and includes in the first volume a carefully prepared consideration of the various therapeutic methods. Part I is devoted to the general consideration of Pharmacology, with Chapters on Drug Combination and Prescription Writing, and the Untoward Effects of Drugs. But one hundred and nine pages are devoted to this section. Section II, which comprises upwards of four hundred and fifty pages is devoted to the treatment of disease by Non-medical Measures, including Climate, General Exercise, Mineral Springs, Hydrotherapy, Electro-Therapeutics, the Employment of the X-ray, the Rest Cure, Nutrition and Foods, the Management of Epidemics and Disinfection, Serum Therapy, Opsonins and Vaccine Therapy, and Glandular Therapy. In this section most of the departments are consigned to very capable authors who have treated the work as thoroughly as the allotted space would permit. The Sections which are notably excellent are those on General Exercise, by Dr. Storey, who has in a very graphic way portrayed the methods and routine of exercise as applied to the treatment of various conditions in which exercise is indicated. The Department of Hydrotherapy has been treated by Dr. Simon Baruch in his characteristic practical style. The Chapter devoted to the Treatment of Disease by the X-rays, by Dr. George E. Pfahler, is characteristic of the author's excellent work in this department, and while conservative is thoroughly practical and representative of this important subject. The Chapter on Nutrition and Foods is well written and is probably as up to date as any writing on this subject in which so much is yet to be learned. The Department of Electro-Therapeutics displays the usual want of knowledge and practical experience of the neurologist, particularly so of the high potential currents, and while in some respects the work is excellent, it is deficient in its consideration of the most modern and practical methods of employing this important agent. The other departments are representative of the present progress of the subjects. Section III, on the Treatment of Infectious Diseases, is a very valuable addition to the literature and has been contributed to by numerous authors who have devoted special time and attention to the respective contributions, which show great familiarity with the subjects treated. The work as a whole is a very valuable addition to modern medical literature. It is printed on excellent paper, embellished with numerous excellent plates, and bound in the usual substantial and attractive manner of the publishers.

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INEBRIETY. A Clinical Treatise on the Etiology, Symptomology, Neurosis, Psychosis and Treatment and the Medico-Legal Relations. By T. D. Crothers, M.D., Superintendent Walnut Lodge Hospital, Hartford, Conn.; editor of the *Journal of Inebriety*, author of *Morphin-*

ism, and Narcomania, Drug Habits and Their Treatment, etc.; Recording Secretary of the American Medical Society for the Study of Alcohol and Other Narcotics, Member of the American Medical Association, The British Medical Association, Honorable Member of the British Society for the Study of Inebriety, etc. Harvey Publishing Co., Cincinnati, Ohio, 1911.

In this volume the writer has treated every phase of the subject from the advanced point of view. Probably no treatise that has been written upon this subject to the present time has so thoroughly covered the causes, symptomatology, diagnosis and management of these unfortunates. Dr. Crothers is thoroughly awake to the employment of all forms of physical treatment in the management of these patients, not relying upon the empirical treatment by drugs, but by removing the debilitating causes which lead to narcotism, and restoring a normal, physical tone, places the patient in a physical condition to control himself against tendencies to fall into the old habits of which he has been a victim. Each chapter is preceded by a synopsis covering the subject matter of the chapter. The book is written in the clear, concise, and beautiful style so characteristic of Dr. Crother's writings in all that he contributes to medical literature. He is undoubtedly the greatest living authority upon this subject to which he has devoted his life work. The volume considering, as it does, a subject of such general interest to the profession should be in the library of every physician. The book is printed on fine paper, with new type, and is well bound.

* * *

MANUAL OF CYSTOSCOPY. By J. Bently Squier, M.D., Professor of Genito-Urinary Surgery, New York Post-Graduate Medical School and Hospital, and Henry G. Bugbee, M.D., Instructor in Genito-Urinary Surgery, New York Post-Graduate Medical School and Hospital. Paul B. Hoeber, Publisher, 69 East 59th St., New York City, 1911. Price, \$3.00 net.

This manual is gotten up in excellent style, leather bound and printed on fine glazed paper, and is profusely illustrated, showing the methods of cystoscopy and in colored plates the characteristic representation of the various pathological conditions found in the urethra and bladder. This work will be found valuable by the student and practitioner for its worth in this particular as well as in the subject matter which clearly and thoroughly describes the methods and conditions illustrated. The work will fill an important place with both the physician and medical student.

* * *

New World Science Series PRIMER OF HYGIENE. By John W. Ritchie, Professor of Biology, College of William and Mary, Virginia, and Joseph S. Caldwell, Professor of Biology, George Peabody College for Teachers, Tennessee. Illustrated by Karl Hassmann and Hermann Heyer. Yonkers-on-Hudson, New York, World Book Com-

pany, 1910. Cloth. List price for class use, 40 cents; mailing price for single copies, 48 cents.

This little volume, printed for a text book in the schools, is written in a most clear and interesting style, and covers in detail the important subjects which every youth should learn. Special attention is given to the physiological functions, and attention to routines which if observed will preserve the health. The latter chapters are devoted to various first aids and methods of treating deformities and defects. The work is to be commended.

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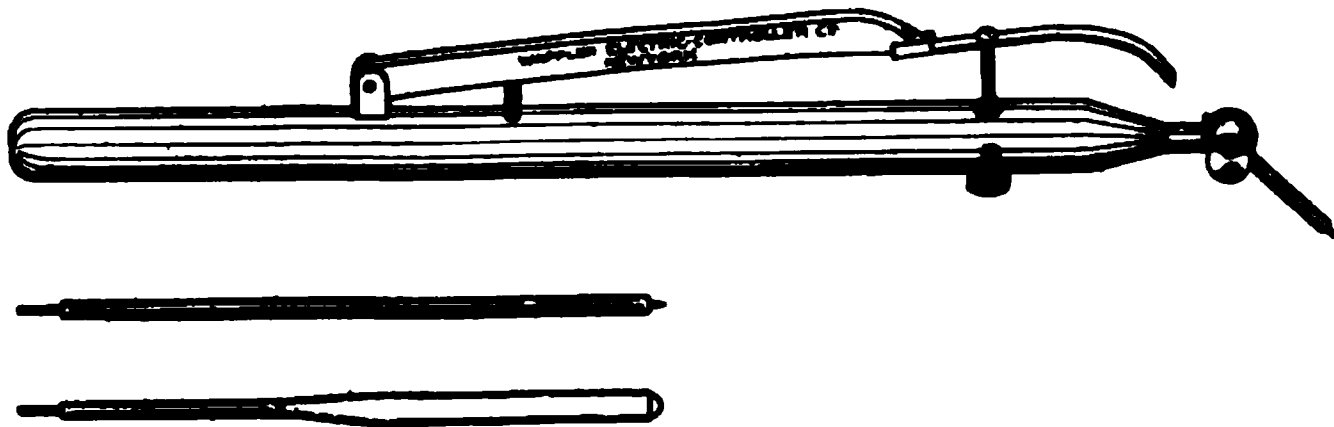
PRINCIPLES OF PUBLIC HEALTH. A Simple Text-Book on Hygiene, Presenting the Principles Fundamental to the Conservation of Individual and Community Health. By Thomas D. Tuttle, B.S., M.D., Secretary and Executive Officer of the State Board of Health of Montana. Yonkers-on-Hudson, New York, World Book Company, 1910. Cloth. List price, 50 cents; mailing price, 60 cents.

This little volume treats in various chapters of the dangers of illness, clothing, foods, preparation of foods, and everything that pertains to the preservation of health. Part II treats of the enemies of health, germs, flies, and the various insect carriers, how to keep germs out of wounds, and the transmission of infectious diseases, with methods of prevention and management for layman's observation. The work is a very well written, clear and practical little book for the instruction of the youth.

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applicators are fitted into handle and current is conveyed to the part under treatment only as lever is pressed down. The handle is of solid construction and long enough to give operator's hand an abundance of room.

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PSYCHOTHERAPY AND ITS RELATION TO OTHER FORMS OF TREATMENT.

THE attention which is given to psychotherapy as a therapeutic agent particularly by neurologists at the present time, indicates its popularity in medicine. It should never be employed as a substitute when other measures are indicated, but as an adjunct or part in the treatment of most conditions. Various sentimental movements have been instituted of a non-professional character, some of which profess to work with the profession, while others ignore everything physical in therapeutics.

While most members of the medical profession recognize, though in varying degrees, the value of suggestion in therapeutics, only those who fail to note the symptom complex employ it blindly. As one of the highest authorities in psychotherapy recently stated, "many so-called healers or clericals who employ it do so without any recognition of the patient's general physical condition;" for most of them are not capable of doing so, but expect to accomplish by psychic impression alone the relief or cure of the patient, ignoring altogether the symptoms complex.

The rational physician, however, who recognizes the duality in disease, treats the patient both from the physical and the psychic aspects of each case. Hope gives greater encouragement to the invalid, and he who can give no hope is of little value as a counsellor in any case. While the confidence placed

in the physician is a large factor, it is far from all that is necessary to cope with the various inflammatory and toxic conditions which confront the clinician.

There are few patients in whom a symptom complex is not to be considered—conditions which cannot be successfully coped with without the recognition of both the psychic and physical status of every case. The existing conditions which are obstacles to the recovery of the patient must receive rational treatment together with the suggestion that restoration will follow the treatment employed.

At this time when preventive medicine and the health of the community is given such substantial attention by state legislatures, it is most important that greater restraint be placed upon irresponsible cults or healers who instead of considering from every point of view the status of health of the individual treat the patient in a freak manner without knowledge of the indications. Undoubtedly the profession is to blame for much of their recognition, because the busy practitioner who started out in the practice of his profession thirty years ago, has followed a less scientific routine than the present knowledge of conditions demands.

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TREATMENT OF LOCAL INFECTION.

WHEN a patient had been admitted on the third day following an injury into one of the leading hospitals with an infection of the hand, who after six weeks' attendance comes under observation with an ankylosed hand, and a part of one finger missing, there is evidence that the methods generally employed at the present time for the treatment of local infection are not what they should be.

A physician with a local hot air apparatus who understands the employment of local dry heat should effectually relieve such a case within a week. It is unfortunate that physicians do not generally understand the principles and efficiency of this method of treatment. Wet dressings, anodynes, and the knife as applied in the treatment of local infection, while often successful in mild cases, are often followed by dire results in severe cases. A case coming under observation as early as the third day should never require the use of the

knife; for by the employment of dry heat as suggested, a sufficient hyperemia is set up in the affected part to locally destroy infection by the combined effects of the heat and the consequent hyperemia and local phagocytosis. This is well known by a large number of physicians, who are familiar with the employment of heat and hyperemia in these cases; but for some reason it has not reached the great body of the medical profession who are still unfamiliar with this principle of treatment.

When the efficiency of the method is known and it is properly employed, it is not assertive to say that no one will lose the use of a hand or arm from the effects of local infection.

The great principle involved in the treatment of these cases is the same as applies generally to the treatment of local streptococcic or staphylococcic infections. The penetrating effects of radiant light and heat and the applications of dry heat at temperatures of 400° to 450° F., with exposed parts wrapped in Turkish towelling, are capable always of arresting these pyogenic processes. It only requires that a sufficient energy be employed in the administration, and in acute cases that the administration be made two or three times daily.

OBITUARY.

It is with great sorrow that we announce the death of Dr. T. Harris Cannon of Baltimore, Md. After a short illness he died at his home on January 29th, 1911. Dr. Cannon was Chairman of the Committee on Static Electricity of the American Electro-Therapeutic Association, in which position he had done valuable original work. He was an earnest investigator, and a progressive therapist; and in his councils and personality he will be missed by his associates.

REMARKS ON THE ELECTRICAL TREATMENT OF INTERSTITIAL AND HEMORRHAGIC FIBROIDS OF THE UTERUS.

BY G. BETTON MASSEY, M.D.,

Attending Surgeon American Oncologic Hospital, Philadelphia.

To those familiar with the controversy that arose twenty years ago concerning the Apostoli treatment of fibroid growths of the uterus, and with the good results attending the method at the present moment in the hands of a large number of practitioners throughout the world, it would seem unnecessary to allude to the method at this time, since it may be regarded as an established procedure concerning which little that is new may be said. There are, nevertheless, new points in the technic worthy of mention in this body, and it may be assumed that a certain duty is laid upon us to guard the best views of the method from the erroneous conceptions of both its friends and enemies, as well as to urge its employment by our fellow practitioners in the cases of those sufferers who would be benefited by it.

Concerning the latter point: our duty to use the method if possible in those patients whom it might save from the risks of an operation—it should be recalled that the specialists who see these cases most frequently are the abdominal surgeons, who naturally have faith in their skill in surgical removal, and, who, with very few and notable exceptions, know nothing of the electrical treatment, and are, moreover, unfitted by their usual work and engagements to properly undertake it. As a consequence, a large number of cases suitable to this method are placed under an avoidable operation.

Few women would hesitate in their choice if the true nature of this overgrowth of normal tissue, with its freedom of menace to life, was explained to them candidly, even though the alternative to the operation was placed in its true light as a prolonged and tedious treatment, though one leading to improved health from the start. It is assumed, of course, that a conscientious physician will only offer this alternative if the growth be of the variety now well known to be suitable to this treatment, and that no obstacle is offered to operative removal in those varieties of fibro-myomas in which imme-

diate operation is wise. It should also be explained that the acceptable case must remain under more or less active treatment for a period varying from one to three years, about one-half of the time being taken up with active treatment and one-half devoted to local reaction, rest and observation.

The most important novelty in the electrical treatment of large abdominal growths, particularly if they be hemorrhagic, is the association of the x-ray, applied through the abdominal wall, with the Apostoli treatment proper. I think it was Pfahler, of Philadelphia, who first noted the value of the x-ray in these growths. From an experience in several cases I am convinced that it is a valuable adjuvant in large tumors, and its use fills in the time between the all important intra-uterine treatments admirably, shortening the total time required for the treatment. Daily applications of the several methods may thus be given to patients to whom a shortening of the total period of treatment is of value, consisting of an intra-uterine treatment every fourth or fifth day, in accordance with the local conditions, and either an x-ray application or a vagino-abdominal application on the intervening days. I assume, of course, that proper precautions will be observed in the use of the rays to avoid dermatitis, the occurrence of which is inexcusable. It is quite likely that the numerous constant current stimulations received by the skin of the abdomen beneath the indifferent pad in such a course of applications assists materially in the prevention of undue local x-ray skin effects after the skin has become somewhat tanned.

Since the rationale of the x-ray treatment is probably related to its particular effects on the ovarian functions, at least in part, it is not so advisable to apply it in growths that are still pelvic in situation in younger women. At any rate, it is not needed in such stages of a fibroid, which are generally readily amenable to the Apostoli treatment proper, which has no drawbacks whatever as a means of restoring both local and general health.

Discussion.

Dr. S. St. J. Wright of Akron, Ohio. I wish to speak of a case and a peculiar dilemma. A woman wrote to me from Alabama describing a bunch that she had concluded to be an enlarged uterus. She said she could only spend three weeks in

Akron for treatment. She was forty-two years old, single, with an intra-mural fibroid about the size of my fist. I had only three weeks' time, and there was danger of producing too rapid involution, loading up her system with the result of the disintegrated and dissolved fibrous tissue. I gave her 20 milliamperes of negative galvanic, by vaginal, cotton covered electrode, and let her inhale some ozone. Two days later I gave her 40 milliamperes. Then 100 m.a. at a sitting followed by the coarse Faradic 20 minutes. At the end of three weeks the uterus was reduced to about the size of two fingers, without any untoward effect whatever. She went home delighted. She was apparently restored to a normal condition.

Dr. John W. Torbett of Marlin, Texas. I want to mention one case in which I got so much better results than I expected. It was one of those cases very much exsanguinated from the hemorrhages at the menstrual periods, which lasted from ten to twelve days. I only got an opportunity of treating the patient just for the purpose of building her up for an operation, because she was run down and I did not expect to do much with the electricity. I used the positive pole per vagina. I was treating her during the inter-menstrual period, and thought I could prolong that period and build her up. I gave her about ten treatments, and then sent her off to the surgeon. There must have been a tumor inside of her uterus, for its entire size was about the size of two fists. The hemorrhages and the size of the uterus indicated a fibroid. The after results indicated that it was evidently a soft, pedunculated intra-mural tumor. The peculiar thing about it was that after ten days she toned up a good deal and gained flesh, and I sent her off to one of the best surgeons for an operation, and when she got there her period came on again. The surgeon never did operate on her. She got rid of the tumor, supposedly as a result of the electrical treatments. The next time I saw the surgeon he said he never got a chance to operate on her; that the tumor came away and disintegrated by disagrees. I used the positive pole in the vagina with the negative on the outside. I have kept up with her for nearly three years and she has never had any trouble since.

Dr. Francis H. Humphris of London, England. I think the Society is to be congratulated upon having a man like Dr.

Massey who will keep this Apostoli treatment before us. Because there have been many workers with this treatment, especially in Europe, who have not got the results that he gets, I had sooner get up in London and advocate static electricity, which is very little used there, than the Apostoli treatment. Perhaps Dr. Massey will try and explain why it is that the Apostoli treatment is discredited by careful men. I would also like to ask him to say definitely in a few words exactly what cases by their clinical symptoms are suitable for this treatment.

Dr. J. C. Walton of Richmond, Va. I want to thank Dr. Massey for his paper. I have been using this method off and on for several years, and in favorable cases I have generally got good results. I had a partner who was a first-class surgeon and opposed to this treatment. I sent him a case, a woman who had had so many hemorrhages that she was very weak. I told him to take the case and treat her. He said he could not treat her, that she would die on the operating table. I treated her according to Dr. Massey's method and she got well. I have always in these cases used the positive pole as the active pole, instead of the negative.

Dr. Massey deserves the thanks of the profession for his pioneer work in this important and neglected field.

Dr. Herbert F. Pitcher of Haverhill, Mass. We are obliged to use the intra-uterine pole in the hemorrhage cases, but in the larger tumors where there is not so much hemorrhage the vaginal application with the negative pole seems to benefit these cases about as much. It not only helps the tumor itself, but it builds up the general health, which has become so debilitated. I would like to mention one case in particular that had refused operation. I called a surgeon in consultation and he said that an operation was the only thing that would help her if we could only build her up to a condition where she could withstand an operation. She was so exsanguinated from repeated hemorrhages that an operation was deemed impractical. She utterly refused to have an operation, so I treated her for about two years with the constant current. The tumor, which had occupied a good portion of the pelvic cavity, gradually receded. That was about ten years ago. Since then she has buried one husband and got another one,

and seems perfectly well now. She is about fifty-eight years old at the present time.

Dr. Massey in closing. I am thankful for the corroboration of my remarks as shown in the case reports, and do not doubt that they could be very largely increased if the members would speak up.

One explanation of the discouragement that Dr. Humphris alluded to is the modesty of the actual users of this method who have found it successful while the medical orators, who are usually surgeons, have given it up. This method was tried quite extensively by surgeons in the days of the starting of this Association. In fact, it was to a group of men using the Apostoli treatment that the first appeal was made to get together for electro-therapeutic discussion, but nearly all of those men who first came in on that platform are no longer either users of the method, or even electro-theraputists. Why? Because largely, with some notable exceptions, they were ignorant of electro-therapeutics when they began the Apostoli treatment, and many of them remained ignorant. One of the noted surgeons of Philadelphia asked me why we did not use putty instead of potter's clay for the abdominal electrode! He had been to Paris and brought back a complete outfit. Now, it is men like that that you hear from in England. They know absolutely nothing about the whole thing, and never did know. They made a large purchase of apparatus in Paris and went into it immediately. One man reported to the American Association of Obstetricians and Gynecologists that he had made as many as seventeen applications on one patient in about two weeks' time, and that as she did not get well he was disgusted and went back to the knife. Now, do you see the point of what I say? This is a one to three year treatment in the class of cases to which it is adapted. It is not adapted to be used by any man who has the operative bee in his bonnet to such an extent that he will not take the time to give to this method. I do not mean to say that some good operating surgeons are not good workers at it. But a man whose makeup is so narrow or so selfish that he is only interested in quick surgery, of his patient's true interests, irrespective of the or possibly in the financial part of his work, will not succeed in this;

possibly it is from some of these gentlemen that you hear from in England.

As to the variety of cases in which it should be used: It is most effective in what has been called interstitial growths; also multiple nodular growths not subperitoneal growths, but growths of the uterine wall that are nodular and not too smooth; in other words, an intra-mural growth that does not present an ivory-ball like mass. The smooth, very hard growths are neither helped nor harmed by it. The same may be said of sub-peritoneal fibroids. No case is suited for it that has any acute or subacute inflammatory condition of the adnexa. These should be operated upon if the growth gets large, or threatens to get large. It should not be used in actively degenerating or very soft growths—and yet now I use it in growths that are softer to the touch than I would before, because I have been relying somewhat on the x-ray in these cases. If these are not hemorrhagic I would not use the Apostoli treatment at all, but if they are hemorrhagic the employment of both the Apostoli method and the x-ray is essential.

As to the polarity: The one modification that I have made in the Apostoli treatment is that I use the positive pole, almost universally because I do think and feel that an intra-uterine treatment is a slight intrauterine traumatism, and that the mercury ions invariably employed by me on this pole are themselves an important part of the treatment. I have not had a rise of temperature in fifteen years in any of my work, not even a big soft hemorrhagic tumor in which I inserted an electrode just a little too large, resulting in a gush of blood like turning on water at a spigot. I was startled for I never saw such a hemorrhage in my life, though the patient said she had had many such that were spontaneous. To stop the hemorrhage I raised the current at once to 400 m.a., though it was the first time in 12 years that I had used so strong a current in a fibroid. The hemorrhage stopped right away, though it recurred some days later, requiring packing. A resumption of similar but weaker applications caused a disappearance of all hemorrhagic symptoms. What a satisfaction it was to know that I had impregnated that little slough I had produced with mercury ions.

The final result in this patient has been a marked restoration of general health and a reduction of the tumor to one-fourth of its original size, making the patient no longer conspicuous.

REACTIONS IN PHYSICAL TREATMENTS.

F. H. MORSE, M.D., BOSTON, MASS.

During a period of twenty-five years using electricity and other forms of physical treatment in everyday office work, many surprises and unlooked for things happen which are valuable and instructive just in proportion as one becomes familiar with electro-physics and the physiological action of the various modalities.

Following all forms of inflammatory action of the deeper tissues, more or less blood stasis and exudation or tissue thickening result. There may be simply increased connective tissue, fibrous adhesions, glandular infections, intestinal or other forms of retained toxins, which are recognized as auto-intoxication.

It is to the latter that this paper will more especially apply, and on the principle that some form of vibratory impulse must necessarily be set up in the tissues of the affected part, in order to cause effective elimination of the infection. The many conditions, such as age, the location of the lesion under consideration, obesity, or the opposite, or chronicity of the disease which exhibit, are such that no universal method can be determined upon. However, things do happen and apparently untoward symptoms often follow certain kinds of treatment. It is certain that benefit often does result when apparently harmful physical applications are made.

Take for example a case of chronic duodenitis, the most important form of disease that we have to contend with to-day, a disease in which dietetic management of the case and proper medicine may do much toward preventing further extension of trouble. When the walls of that part of the intestine are saturated and the surrounding tissues more or less infiltrated with toxins, then physical treatment is our sheet anchor.

Mechanical vibratory stimulation over the liver and duodenum and on the corresponding spinal nerve-centers, high tension faradic, sinusoidal, and static induced currents used with an apparatus giving a surging effect through the parts with large surface electrodes, interrupted galvanic, high-frequency and static wave currents, are all used more or less effectually in causing the desired elimination.

Physicians doing this kind of work are so often confronted with the statement from their patients that "they feel worse the next day after a treatment" and often express an opinion that "their treatment was too strong for them," but also state "they feel much better the second or third day than before treatment."

The symptoms following application very commonly complained of are headache, soreness of the cervical glands, "rheumatic feeling" in different parts of the body and oftentimes an actual tenderness and swelling of the joints, which almost invariably subsides or disappears within 48 hours.

The above disturbances are unquestionably due to sudden liberation of the toxins, when the lymphatics become overloaded before the emunctories can care for the extra work suddenly thrust upon them. All these constitutional effects may not be present following a fairly vigorous treatment of intestinal auto-intoxication, but there is certain to be more or less reaction, of which the patient should be made cognizant; otherwise certain disasters are apt to follow, such as discontinuance of treatment, discredit of the method by the patient, and disappointment to the operator. On the other hand, the patient may be assured that these reactive effects are essential, and will continue to grow less and less after each seance, as the anticipated results are obtained. This same rule may apply to chronic-rheumatoid arthritis, synovitis and chronic neuritis where static sparks have been vigorously applied and the local soreness is temporarily increased.

I will cite a case of alcoholic gastritis and duodenitis of six months' duration, which had been treated by the usual drug medication, and in which reaction was more conspicuous because of the infection being aggravated by the man's habits.

Mr. J. C., 40 years, occupation commercial traveller, at the first examination showed an arterial tension of 170 mm. distended stomach and duodenum, furred tongue, marked tenderness over his left dorsal region from the 3rd to the 6th nerve exit, and on the right side from 7th to 11th nerve exit.

My first treatment consisted of a gastric lavage, not by the usual method of swallowing a tube, but by having him drink half pint of a solution of sodium phosphate and sodium salicylate, followed by one or two glasses of Poland water, shaking him vigorously by placing the band of the Hanfield oscillator

over and around the stomach, after which having him lie for five minutes on his right side that the solution might gravitate into the duodenum. I have found this procedure very efficacious and use it often. I then used a sinusoidal surging current through the duodenum for five minutes and the static wave current over the parts for five minutes, and told him he would probably be a sick man the next day on account of setting free so much infection, but it was absolutely essential to his getting well. Within 18 hours he had a temperature of 103° F. and a pulse of 110. Many of his joints were slightly swollen and tender, and he expressed himself as being quite sure that "he was coming down with rheumatic fever," as he had years previously suffered from two attacks.

An active catharsis followed 1 gr. of calomel, and in 36 hours pain, soreness and temperature had all subsided, and the tender spots along the spine, which in my opinion are of great diagnostic and prognostic value, were much, but not wholly, relieved. In the ten subsequent treatments given once every four days, the reactions were present, but grew less and less until they were not noticeable after the sixth treatment, when the spinal tenderness disappeared entirely. That was two years ago and by reasonable care as to mode of living he has kept well ever since.

There is nothing remarkable about the above case or treatment, but it serves to illustrate the point, that the unpleasant reactions, if understood, need not deter us from following out well established rules of treatment, that experience has proved to be of value in non-purulent, pent-up infections.

Appreciating the fact that it is sometimes wiser to do a little less therapeutically at each treatment than we feel that the case needs, and realizing the many reflex nerve disturbances whose importance to the patient is apt to obscure more important pathological conditions, it is here that the physician is called upon to exercise his best judgment and diagnostic ability.

In the purely neurasthenic cases, the vigorous, or otherwise, forms of physical treatment are not followed as a rule by any marked reaction. On the contrary, the salutary effect is even better the day following.

In incipient, and many times well-advanced cases of locomotor-ataxia, where a cure is not to be thought of (as the

well-known pathology of the disease excludes that), much may be done for the relief of the symptoms and retardation of the degenerative process, by the frequent applications of static sparks and mechanical vibration along the spine, and I have yet to see a case where the treatment was followed by any unpleasant reaction.

Discussion.

Dr. G. Betton Massey of Philadelphia. There are two or three thoughts in connection with Dr. Morse's paper that may be worth mentioning. One is a very lively recollection of the collapse of a patient after a general, old-fashioned faradic or galvanic treatment all over the body, made by me some years ago during the first visit of a patient to the office. She went home to the suburbs and I did not see her again. According to a letter received later she fell into such a collapse after she got home that she had to send for her family physician. I have been very careful since not to overdo the application the first time.

It is evident that we should consider the period of reaction after all physical measures in proportion to what we know of the physical conditions produced by the measure. Take, for instance, an intra-uterine treatment for a fibroid. If we made such an application on the outside of the body, as I do somewhat similarly in cancer, rodent ulcer, and so on, it would be three weeks before the effects of a single, more prolonged treatment were entirely gone. So that we must remember that intra-uterine treatment has necessarily a period of reaction, a local reaction, as well as these more general physiological reaction, which should be counted as a portion of your treatment.

Dr. William B. Snow of New York. I think, furthermore, that in all our work we are seeking reaction. Really our work is the study and employment of reactions. It is either the response to a certain stimulus, or a negative effect, which might not be considered a reaction, but will be later followed by a reaction. In fact, the whole study of the application, particularly of physical measures, as also of food administrations, is a study of reaction. It is a thing that we should always bear in mind, that we are seeking to derive effects from the things we do which, acting upon the economy produce

certain reactions which shall substitute a normal condition for an abnormal.

Dr. Francis B. Bishop of Washington, D. C. Dr. Morse's paper is a very timely one. There is no doubt that we get decided reactions from all our treatments. In fact, I think that the primary effect of our treatment is often a reactive effect; in other words, a reflex effect, and we should always bear in mind the physiological fact that any stimulus transmitted through the sensory nerves to the spinal centers is more intense and more lasting than a stimulus that could be applied directly to the centers. That is a physiological fact, I think, that is well established. For years it has been my custom to give less and less strong treatments, because I have been awakened to the fact that the body itself has a function to perform, and that all we can do in our treatment is to aid Nature. We cannot by any process of reasoning or application supplant Nature. By the application of our stimulus to the surface we stimulate the peripheral cells or the peripheral endings of the sensory nerves. That stimulus is transmitted to the centers, and from there as a rule we get our effects. But by overstimulating those centers from the periphery we get a reaction which is sometimes very disagreeable. I have had that experience on several occasions to my great sorrow. This mechanical stimulation that Dr. Morse is speaking of—vibration—is undoubtedly, when applied gently, a very pleasant sensation. I remember one time treating a case of sciatica when I first began the use of vibration. I had given this gentleman the continuous current, and I had given him the wave current—it was a very bad case—and winding up I gave him mechanical stimulation through vibration. When he came back again I undertook to give him the electrical treatment, and he said, "Oh, Bishop, let's get right down to the real medicine. Let's take this vibration. It is so much pleasanter than the others." Of course, it was pleasanter, but in my opinion not the proper thing to do. He eventually got well, but not through mechanical vibration.

I am very much obliged to Dr. Morse for this timely paper. I think it opens up a subject for our earnest consideration.

Dr. William T. Bishop of Harrisburg, Pa. I had in view exactly what has been brought out in this discussion when

I asked a question the other day and the Society did not think it worth answering. I asked what was the after effect when anesthesia was produced. This is exactly what this paper has brought out. It was an important thing; but they seemed to pay no attention to it.

Dr. J. C. Walton of Richmond, Va. I want to commend Dr. Morse for his excellent paper, and to say I think it is on the right line. All of us should be honest enough to report our bad results as well as the good ones. Austin Flint once said that the patient would get more benefit if the profession would report their failures instead of their successes.

Dr. Louise G. Robinovitch of New York. Dr. Bishop asked about the after effects of electrical anesthesia. The after effect is none. As soon as we break the circuit the patient is in perfect condition. The blood pressure in animals becomes normal immediately, and the temperature and respiration are normal. That is on animals. In man, Dr. Johnson told you that there was absolutely no unfavorable reaction. On the contrary, the man felt as if he had not undergone any operation at all. That is not the case if you use chloroform or ether.

Dr. S. St. J. Wright of Akron, Ohio. Dr. Morse has done us the kindness to hold up a danger signal against which many of us may lose part of our success and become discouraged, and we owe him a debt of thanks for this. The use of the clinical thermometer will enable a person to foretell whether the reaction will be injurious. The thermometer will show you that a person's temperature is below normal before breakfast if his condition is subnormal.

Dr. Morse in closing. I want to thank the gentlemen for their kindly mention of the ideas that I promulgated.



HOW TO SECURE ECONOMY AND PROFICIENCY IN GALVANIC BATTERIES.*

BY CURRAN POPE, M.D.,

Ex-Professor, Physio-therapy, University of Louisville, Medical
Superintendent, The Pope Sanatorium, member
American Medical Association, etc.

Those who have been called upon to use the usual galvanic batteries composed of the Le Clanche type of cell, have doubtless experienced considerable difficulty in preventing the evaporation of the sal-ammoniac fluid. It has been my observation that the battery never does as well where plain water is added to the cells to overcome the evaporation that takes place, so that any method that will prevent the evaporation of the fluid and the wear and tear upon the zinc is one well worthy of consideration by those to whom the galvanic battery is a necessity in their practice.

I do not like the direct or continuous commercial current in therapeutics. It is irregular, pulsating and more uncomfortable in the same voltage and amperage. Despite every care that can be exercised, there is unquestionably an element of danger, especially where the applications are made about the head and neck and to the spine. For these reasons, I have employed a forty to fifty cell cabinet battery, containing Axo-Le-Clanche cells, using cell selector rheostat, etc., in order to secure the current desired with the least number of cells, thus giving my patient the greatest degree of comfort and safety.

In order to prevent the wear and tear of the zinc, which, as every electro-therapeutician knows is greatest at the surface of the electrolyte, I have adopted the plan of painting the connection end of the zinc with two or three coats of thin asphaltum, the coat of asphaltum extending a sufficient distance on the zinc to be below the level of the electrolyte. When the zincs have been coated, and the asphaltum is thoroughly dry, they are cleaned carefully with fine emery paper, dipped in dilute hydrochloric acid and thoroughly amalgamated with metallic mercury, a thin coat being secured by rubbing the surface with a wad of absorbent cotton, soaked with the diluted acid. The zincs are then washed in warm water, are dried and present a burnished appearance.

When it becomes necessary to refill or recharge the battery, the old zincs are thrown away and the porous cups carefully washed, as are the glass retainers. The glass jars are then filled to the desired height with the sal-ammoniac solution and the porous cups inserted. These, as a rule, fit very securely in the opening, and as there is a collar upon which they rest there is little, if any, opening between the glass jar and the porous cup. Should there be an opening, this can be easily closed by means of a Mason's fruit jar rubber, placed around the cup and on top of the offset of the collar. As a rule, the hole for the zincs is large, comparatively speaking, and it is through this opening that most of the evaporation takes place, especially where the battery is kept in a warm room, and the room where electrical treatment is given should always be warm, because of the necessary disrobing required to give the treatment.

In order to prevent this evaporation, at the suggestion of my brother, Mr. A. T. Pope, first-class corks were fitted to the opening and with the cork cutter holes were cut, so as to permit the introduction of the connection end of the zinc. By this means the zinc was held more firmly in the electrolyte and evaporation prevented.

If the trouble is taken to follow out this method it will be found that the expense is very little additional, and that the life of the battery is about quadruple that of the ordinary filling. At the same time "creeping" is prevented.

As many men are deterred from the use of the galvanic battery because of the more or less frequent replenishing of same, it may not be amiss to state that our battery prepared in this manner, and constantly in use from three to five hours a day *every day*, lasted approximately two years. As far as my personal inquiry goes, I have never found anyone whose battery has lasted anything like as satisfactory a length of time. It must not be presumed that the battery is used with very small amounts of current. On the contrary, we employ very heavy currents, in spinal, in abdomino-spinal and in pelvic work, so that the battery really has a very heavy call put upon it at all times.

It is to be hoped that others will take advantage of the experience here gained.

115 W. Chestnut St.

NOTES ON THE TREATMENT OF CANCER BY
MEANS OF THE X-RAYS AND RADIUM.

BY J. HALL-EDWARDS, L.R.C.P., F.R.P.S., BIRMINGHAM, ENGLAND.

The subject matter of my paper this evening is not new, at the same time, no apology is necessary for again introducing it, owing to the extreme gravity and urgency of the case. Notwithstanding the numerous and never-tiring efforts which have been made to grapple with the terrible scourge Cancer, statistics recently published go to prove that the mortality is increasing, and that so far science has ignominiously failed to stay its progress. Although our knowledge of this disease has greatly increased, and our methods of treatment have become more numerous, and perhaps more scientific, the fact still remains that early and complete excision gives the best chance to the patient, and yields on the whole the most satisfactory results. There can be no doubt that excision as practiced to-day is more satisfactory than excision as practiced fifty years ago! This is due entirely to improvement brought about in surgical methods. The improved results secured by primary operation are due not to our increased knowledge of the disease itself, but to a better understanding of the principles involved in scientific surgery. Under modern conditions fewer patients die as the direct result of primary operation, and, inasmuch as under the conditions of modern surgery, a far more sweeping operation can be performed with a minimum of risk, secondary infection follows less rapidly, and a lengthened period of immunity is secured.

Excision to be successful must be performed early, and must be complete. The small amount of success recently secured is due in no small degree to the action of the patients themselves, who, owing to the general spread of medical knowledge seek advice far more early than was previously the case. In dealing with malignant growths in the breast, it is now generally held that every tumour in which malignancy is expected should be immediately and completely removed together with all the glands in the immediate neighborhood. The statistics secured by this method of procedure are of little value, and are occasionally very misleading, inasmuch, as in a large majority of cases it is impossible for a complete and scientific diagnosis to be made, and it must happen that occa-

sionally benign tumours are removed, and cures claimed where none exist. Increased knowledge on the part of the public would undoubtedly yield still better results. A large percentage of patients still neglect to seek surgical aid until the disease is so far advanced that successful operative procedure is rendered impossible. To many persons the idea of an operation is so abhorrent that they neglect seeking advice until it is too late, and frequently even after the gravity of their case has been made fully known to them, they refuse operation in defiance of the wishes of their friends and relations.

If we accept the theory that cancer in the first instance invades the body from without, and is primarily a local disease, it should follow that early excision undertaken before any constitutional symptoms are manifest, a "Cure" may be secured, and should no return of the disease occur within a period of from three to five years, the result may be considered entirely satisfactory. So-called cures secured by following this method are common, and are generally accepted as direct evidence of the value of operative methods. Scientifically, I doubt whether these cases should be classed as "cures" at all. The disease has certainly been got rid of, and possibly may not return, but a "cure" can no more be claimed than in the case of a painful corn which is cured by amputation of the foot.

We have at hand ample evidence that many cases of malignant disease have been cured, and in some instances after such cases have been pronounced incurable. In dealing with cases by other than operative methods, it not infrequently happens that if a "cure" be secured, we are told that it has come about spontaneously, and that the same end would have been secured had no method of treatment been adopted. In a leading article in the *British Medical Journal*, of February 6, 1909, dealing with the therapeutic effects of radium, the writer says: "It is now well known that in some cases a process occurs in epithelioma which leads to spontaneous cure, this fact must never be lost sight of in estimating the results of the treatment of Cancer." I fail to see how the word "spontaneous" can be properly applied under these conditions, inasmuch as the writer here admits that this "Process" only occurs in cases under treatment. So far I have failed to find the history of a single well-authenticated case in which spontaneous

cure has occurred apart from some method of treatment. To what, may I ask, can this "Process" be ascribed, if not the result of the special treatment adopted? The theory of spontaneous cure is, as a rule, only brought forward when there exists a wish on the part of the sceptic to discountenance a fact which is opposed to his own pet theories, and it cannot therefore be taken into serious consideration when dealing with a subject upon which our knowledge is so incomplete. The onus of proof of spontaneous cure rests upon the credulous, and until this truth is established we must not let it stand in the way of unremitting efforts to discover a real cure for cancer. Mr. Sampson Handley says: "That although several cases of spontaneous cure have been recorded, the disappearance of a cancer which has clinically reached its full development, has never yet been absolutely demonstrated by a complete necropsy with a negative macroscopic and microscopic examination of the tissues for cancer." These remarks of course apply with equal force to all cases of reported cure, either following operation or any other method of treatment. There exists no report of a spontaneous cure having occurred in a case in which no method of treatment was adopted.

A statement has been made that the literature of Cancer therapeutics does not contain the record of a single fact which cannot be paralleled among the histories of untreated cases. I would like to ask where we are to find the histories of untreated cases? So far as I am aware none have been recorded, and it is next to impossible to imagine that the belief in spontaneous cure is so great that any surgeon would be justified in refusing treatment on the grounds that a spontaneous disappearance might occur. It is admitted that the Cancer process is but a slight deviation from the normal. We may therefore assume that a cure may possibly be brought about by a slight alteration in the environment of the diseased cells. Under these conditions, it is therefore equally unscientific and absurd to accept the theory of spontaneous cure, as by doing so, we are apt to place a barrier in the way of progress and further investigation.

I have already shown that it is next to impossible to obtain a full and complete diagnosis if the best methods of dealing with the disease as proved by practice are to be secured. This applies equally of course to cases treated by other than surgi-

cal methods, and this fact is taken full advantage of by those whose treatment of the disease begins and ends with the knife. During the last ten years I have treated a large number of cases of various types of malignant disease, and in a few instances a clinical cure has resulted. In all these cases the clinical appearances and histories went to prove beyond the shadow of a doubt the existence of malignancy. Yet in each instance when I have exhibited the cases before one or other of our Medical Societies I have been told that there must have existed a mistake in diagnosis. Notwithstanding the fact that at least in one instance I was able to show microscopic evidence of malignancy.

Whilst I am ready to admit that there is a tendency on the part of investigators in new branches of research to over-estimate the value of the agents they employ, this is more than counterbalanced by the scepticism of those who, overwhelmed by the achievements of modern surgery, can see nothing beyond it. "There are those," says Doctor Paris, "who cherish a spirit of scepticism from an idea that it denotes the exercise of a superior intellect." There can be little doubt that scepticism unrestrained constitutes a barrier to progress, and in dealing with a disease like Cancer, whilst it should be our earnest endeavor to protect sufferers from quacks and charlatans, we must be careful that our enthusiasm in this respect does not have a tendency to hamper progress. Dr. Dugal Stuart has said that unlimited scepticism is as much the child of imbecility as implicit credulity. It must be admitted that the attitude of the general body of the profession towards new methods of treatment is one of marked indifference, and there can be no doubt that this attitude has to a great extent acted as an incentive to over-estimation. The existence of his Society, together with the provision of a section of Electro-therapeutics at the Annual Meeting of the British Medical Association, has done much to establish in the minds of the general body of the profession confidence in the good intentions of those engaged in the investigation of the application of physical methods to the relief of pain and cure of disease. Whilst many of the agencies at our command have failed to produce the results predicted for them, and while some, which were at one time lauded to the skies by the over-enthusiastic, have been relegated to the scrap-heap, the fact remains that others have gained alike the confidence of the profession and public, and have proved themselves of immense benefit to humanity.

It is not my intention to enter into a discussion on the many theories which have been advanced relating to the causation of Cancer, but taking into consideration the fact that irritation is one of the most common causes, and that irritation can to a certain extent be avoided, it follows that certain preventative measures are at our disposal. It is acknowledged that many

benign growths have a tendency sooner or later to become malignant, and that they are specially prone to do so after an operation, and more especially when the operation involves certain regions of the body in which Cancer most commonly manifests itself. Of the many benign tumours which show a special tendency to become malignant, warts, moles, dermoids, fibromata of the skin, uterine myomata, and papillomata may be specially mentioned. Warts and moles upon the face are so prone to develop epithelioma or rodent ulcer, that under all circumstances they should be removed, preferably by a non-operative method. In looking through my notes of the large number of cases of rodent ulcer and epithelioma which have passed through my hands during the last twelve years, I find that a very large percentage have a history of the disease having started from a pre-existing wart or mole. Warts and moles upon the face are of necessity irritated to a much greater extent than are similar growths upon the protected portions of the body. This increased irritation is mainly brought about by the rough usage to which the face is submitted during the process of washing and drying, and in addition, the irritation is kept up by the frequent deposit upon the growths of dust and dirt, whilst they are also exposed to frequent changes of temperature. Growths in this position are still further irritated by the habit of picking and scratching which is common in persons affected with them. It has been amply proved that the presence of dust and dirt and uncleanly habits generally are potent factors in the causation of Cancer. I cannot too strongly advocate the removal of such growths, and taking into consideration the fact that Cancer frequently follows operation for the removal of benign tumours, I would advise that these growths be removed by one or other of the methods at our disposal which do not entail the use of the knife. Many elderly persons prefer to retain pre-cancerous growths upon their faces rather than submit themselves to operation. We have at our disposal now several methods of removing these growths which entail little more than slight personal discomfort, and there is therefore no excuse for retaining a condition which has proved to be an immense source of danger. Amongst these agencies may be mentioned x-rays, radium, carbonic dioxide snow, and diathermy. It may be argued that malignant growths are quite as likely to appear in the scar-tissue produced by the above mentioned methods, as they are in the scars produced by excision, but inasmuch as up to the present this is not proved, and inasmuch as the methods suggested are nearly painless, and that therefore the real objection to having them removed ceases to exist, I have every confidence in recommending these preventative measures.

During the last twelve years, a very large number of cases of malignant disease have been treated at my hands by one

or other of the physical therapeutic agents which occupy our attention. By far the larger number have been treated with the x-rays, and although I freely admit that the results achieved are on the whole disappointing I must confess that in the x-rays we have an agency which promises (when their properties are better known and their methods of application are improved) to place increased power in our hands of fighting this terrible disease. No therapeutic agents known offer a more remunerative field for continued research than do the x-rays and radium. Their action upon certain malignant growths is so marked that I feel we are fully justified in continuing their use, and in endeavoring to modify our methods in the hope of increasing our knowledge in their methods of action. Experience goes to prove that in by far the larger majority of cases, the x-rays relieve pain, retard growth, dry up ulcerating surfaces, prolong life, and generally improve the health of the patient. In addition they occasionally bring about absorption of the growths, and produce at any rate a symptomatic cure. Their method of action appears to the casual observer to be exceedingly erratic. This is undoubtedly due to our lack of knowledge, for it must be admitted that differences in environment and otherwise must exist even in two cases, which to all intents and purposes are similar. Given, for instance, two cases in which secondary nodules have appeared after amputation of the breast. Even if both are submitted to the same treatment, in one case the nodules will entirely disappear, whilst in the other no observable effect is produced. Much stress has been laid on what is called the selective action of these agencies, and I cannot help thinking that this theory is responsible for much misconception. If we are to believe all that has been said concerning the selective action of x-rays and radium, we shall have to admit that, at any rate in the case of radium, it has a selective action which amounts almost to an intelligence, for it appears to be able to select just the particular cell which the operator desires. Taking it for granted that in a healthy body the normal tissues ever resent the invasion of disease cells, and that there is ever present a tendency to destroy them, it appears probable that in some way or other the normal tissues may be so strengthened that increased fighting power is accorded them and that in some instances they are enabled to conquer and utterly destroy their natural enemies; that there may exist in every case a limited period when appropriate stipulation of the normal tissues may give them the encouragement which is required to secure victory.

The evidence at hand that the x-rays have a greater and more deadly action upon diseased cells than upon normal ones is certainly inconclusive and in many instances disproved, whilst we have much evidence to show that they have a greater

power of destruction upon normal cells than upon diseased ones. For example, malignant growths have over and over again arisen as the result of prolonged and unscientific exposure, and in the early days when the normal areas surrounding disease patches were imperfectly protected, I have more than once noted destruction of the former whilst the latter to all appearances were unaffected. We have much evidence to prove that the good effects produced by the x-rays are not so much due to the destruction of the diseased cells as to stimulation of the normal ones, and that certain alterations in the blood are in no small measure responsible. It is a curious fact that several observers have noted alterations in parts of the body situated at a considerable distance from the part irradiated. For instance, in a case of Hodgkin's disease, I have noted a marked diminution of the glands in the inguinal region follow exposure of the cervical glands; whilst a patch of lupus upon the leg has disappeared during the treatment of the face. Personally, I have obtained no proof of the existence of a selective action, and I consider that this is contraindicated by the fact that absolutely certain results can only be secured upon healthy tissues.

To our ignorance of the methods of action of the x-rays and radium must be ascribed our inability to use them to the best advantage, and it must follow that further investigation will increase their usefulness. Recent discoveries concerning the action of filtered and reflected rays bid fair to place in our hands a more efficient and scientific method of using them, and from the results produced I am of opinion that we are fully justified in continuing to use them in such cases as previous and prolonged experience have taught us to expect satisfactory results.

During the first five or six years in which I applied the x-rays in the treatment of Cancer I now know that the cases treated were not such as were likely to secure benefit. They were in nearly every instance the derelicts of the surgeons which had progressed to such an extent that therapeutic measures were useless, and beyond the relief of pain and the occasional drying up of sloughing and ulcerating surfaces, no results could possibly be looked for. In treating these cases I curiously enough adopted much the same methods as I do to-day, notwithstanding the fact that at that time we had no method of measuring the dose administered. Our methods of measurement of dosage are even to-day inefficient and unsatisfactory. At the same time, we are now in a position to administer a dose with something approaching scientific accuracy.

(To be concluded.)

Progress in Physical Therapeutics.

GYNECOLOGY AND ELECTRO-CHEMICAL SURGERY.

EDITED BY G. BETTON MASSEY, M.D.

Ionization Treatment of Sciatica.

Wullyamous says (*British Medical Journal*, Abstracted in *Charlotte Medical Journal*) that at the beginning of the treatment the patient takes a hot bath of half an hour's duration in order to rid the pores of any fatty matter they may contain, as this offers a strong resistance to the passage of the ions. The electrodes are large plates of lead, trapezoidal in shape, covered with absorbent material. The cathode is charged with a solution of sodium salicylate to 3 per cent. as hot as possible—about 120° F.—the speed and number of ions being proportional to temperature. The patient lies upon the cathode, and the anode is applied to the abdomen, thigh and leg. The duration of the treatment is from sixty to ninety minutes, and at the beginning of treatment they take place every two or three days. The intensity of the current generally reaches 200 milliamperes. If a patient feels a burn, a layer of caoutchouc (or vaseline paper, Ed.) is placed between the skin and the electrode at that point. The number of treatments varies between one and fifteen. Remarkable results are said to have been obtained by the treatment, and some cures have been effected after the patients had taken long but ineffectual courses of thermal baths.

It is to be hoped that inveterate static and high-frequency workers will not fail to employ the salicylic acid ion, after this method of Leduc, in at least those cases of neuritis that show poor progress under less troublesome methods. Note should be made of the very large amperage and duration advised, both made possible only by the size and conformation of the electrodes and the evenness of their coverings. To use small, movable electrodes imperfectly adapted to the body surface, is to spoil the application entirely.

Leduc's own description of these applications in his valuable book, "The Ions in Medicine," includes a description of large, pliant metal backings of the electrodes that have special connectors soldered to them. This detail alone adds to the difficulty of the average practitioner's employment of the method, as he has no such electrodes and probably cannot get them made. The following description of an improved pliant metal

electrode will help such persons out of this difficulty, since, with the possession of two simple requisitions: thin x-ray protection metal, tinfoil, or thin sheet lead, and some fine cotton-covered copper wire (say No. 28), they may make up the electrode themselves in a few moments to suit the particular case at little expense, and have a better contact than with commercial articles.

These electrodes are made by cutting out with scissors a piece of the thin metal to fit the limb and also a sufficient length of the wire to act as the conductor. The two are connected by simply threading the wire through several pin holes made in a corner of the metal and bending the corner of the metal several times over itself. This connection remains perfect until the wire is broken, when it may be reattached in as simple a manner.

With suitable layers of absorbent cotton to retain the electrolyte over the skin, an evenness of contact may often be secured by passing an ordinary bandage over the whole and around the limb, leaving the wire conductor free. G. B. M.

Electrical Treatment of Obesity.

A. Laquerrière details (in *Journal de Médecine de Paris*, Abstracted in *Medical Record*), Bergonié's electrical method of treating obesity by exercise of the various muscles, the surface of the body being entirely covered with large electrodes, so that all the large muscular masses are affected. The operator then applies a tetanizing faradic current through the electrodes, in such a manner that there is a rhythmical action, the excitation lasting half a second, and the interval of repose a half second. The current should be strong enough to cause marked muscular contractions. During this treatment the body becomes covered with sweat, but the patient feels no disagreeable sensations, only the contraction of the muscles. The heart and respiration are increased in frequency, in response to the need of increased oxygenation in the contracting muscles. There is no appreciable fatigue when the sittings are properly managed; the appetite is increased and sleep is improved; blood pressure is lowered as it is after simple exercise. One gets general active gymnastics, but involuntary ones and without the interference of the psychic centers. It is difficult to find any other system of gymnastics that approaches this in the general action of all the muscles. This form of exercise may be used even for persons who are persuaded that exercise is bad for them. Since the movement

is involuntary the nervous system does not become fatigued, in the fearful and the neuropathic, one may get the benefits of exercise without their having any of the inconveniences of it. Bergonié has obtained brilliant results by this method in the obese, but the method may be employed also in all the nutritional troubles. This method is both preventive and curative, since it increases the musculature of the patient, and he will not again fall into the hygienic faults that have caused his obesity.

There is a distinct novelty in this procedure of the distinguished professor of Bordeaux, and it would seem to have a value distinct from the classical Duchesne procedures, and capable of a less laborious application by the use of automatic devices. The electrodes described in the preceding paragraphs could also be used in these applications. G. B. M.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M.D.

Radium and Cancer (N. Y. Med. Journal).

Morton states that some varieties of cancer are much more responsive to radium than others. With few exceptions it is in the slow growing forms, where it acts best, and in which a diminution of size may be expected. Unfortunately we have no statistics as to the number of cases in which it fails. Failure occurs, not infrequently, in cases where large quantities of radium are used. We know also that it does not always cure the benign rodent ulcer, nor prevent its recurrence. At present the position of radium therapy seems to be that while it is of undoubted value in many cases, its chief function is in aiding, and not in excluding the other recognized methods of treatment. Until it can be proven that relapse and metastasis is not more common after regression from radium, than after excision, the method must be reserved for those cases, in which operation is contraindicated or in recurrences. Apart from the question of the curative effects of radium, there is one point of practical importance which deserves attention. It is in the cases in which radium acts beneficially that it acts at once. Within fourteen days after beginning treatment an unquestioned diminution in size will be found in all cases in which radium is able to effect a regressive influence. Occasionally this is seen as early as the third or fourth day. If no improvement is found in this time further treatment is useless, except perhaps for its palliative effect. He considers that there is no certain means of telling the effects of radium in

any individual case, and he has found this test very useful before subjecting cases to prolonged courses of treatment.

Roentgen Rays in Malaria.

Skinner and Carson remark that their experience with x-rays in malaria is that it relieves the splenic pains and reduces recent engorgement: that the temperature falls and does not usually rise again; and that recovery is not attended by the anemia usually present in cases treated with quinine. They have not had to fall back on quinine in a single case treated with the x-rays, while they have had cases which resisted quinine and yielded promptly to x-ray (quinine being discontinued). They have five cases of chronic induration of malarial spleen under treatment, but the progress made has not been sufficiently marked to enable the authors to make any definite statement as to the special value of the x-ray in such cases. But they are so impressed with the result in malarial fever cases that they hope that their experience may be sustained by others and on a more extended scale.

Practical Electro-Therapeutics and X-Rays as Remedies in Skin Diseases. By Theodore F. Johnson, M.D. (*The Therapeutic Record*).

The doctor commences his excellent paper with a very flattering tribute to the ray in eczema. He claims that he began the use of the x-ray especially for the treatment of this condition, but as his experience increased he found it was not only the agent *par excellence* in eczema but in many other conditions as well. He discusses in a very learned way the difference in x-ray produced by coils and static machines, and finally states that, as far as skin troubles are concerned, either will do. He gives a vast array of authorities on the use of the agents not only in eczema, but many other conditions and calls especial attention to the false way in which many physicians use their static and x-ray machines. Their ignorance often is such that they really do not know when they are making electricity, or rather do not know when the machine is generating and when it is not. He finds now that he can treat with the x-ray inoperable cases of cancer and make them much more comfortable than by any other means. He gives a very fine epitome on the differential diagnosis of eczema and erysipelas, psoriasis, scabies, eczema of beard, sycosis, tinea barbæ, eczema of palms and syphilis, and states that it makes no difference as to the case being chronic or not, it is possible to always give a favorable prognosis.

He considers the x-ray to also be a specific in acne, and has not met with a failure in 80 cases and considers the results marvelous.

The author's results in psoriasis are all that could be desired. He calls especial attention to effects of clothing dyed with cheap analine dyes, carbolized salves and other irritants which are prone to cause eczema and psoriasis to relapse. In lupus vulgaris he calls attention to Burdick's record of 60 cases with 8 failures all owing to other complications. Tinea and sycosis are readily mastered by means of the x-ray. In his opinion tuberculosis is almost as amenable to the x-ray as skin diseases.

The writer is a very enthusiastic electro-therapeutist and I am sure he has a right to be when he can show such uniformly good results, and I agree with him in that it will be a great day in medicine and the healing art when there are 50,000 doctors using electro-therapeutic agents in the same way and getting the same or better results in this United States.

J. D. G.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

The Drugless Treatment of Pneumonia in Children. By Dr. Donald (*Canadian Practitioner*, June, 1910). .

This is an interesting article. It shows the continued growth of physiologic methods in acute diseases. Concerning the article the *Therapeutic Gazette* voices the author's opinion in the following words:

Some qualifications are given to the statement that his cases were treated without drugs. When such a statement is made, the impression which it is desired to convey is that there were no definite drug measures adopted beyond what were necessary for the relief of unpleasant, distressing, or dangerous symptoms. The whole line of expectorants, febrifuges, and alteratives are entirely discarded, both in the lobar and bronchial types. The rule has been that as soon as the case is diagnosed, the child is sequestered in the infirmary belonging to the institution, which consists of two large, bright, sunny, airy rooms, well heated, in a quiet portion of the building, away from all noise and disturbing influences. The child at once receives a warm bath, it is put to bed, either with or without applications of some kind upon the chest. During Dr. Douglas' term of service all chest protectors or poultices were discarded, while during the term of Dr. Donald it has been

customary to apply them. There was a friendly difference of opinion here in regard to this line of treatment. The cold-air treatment was considered, only to be immediately forbidden, and all the children were kept constantly, as near as possible, at a temperature of 65° to 70° day and night. The object desired was to secure not any special degree of temperature, but a uniformity of temperature, whatever it might be; and the feeling has grown that any degree of temperature is consistent with good treatment, provided that degree be maintained uniformly. However, with children from two to fourteen years of age, as are theirs, many of them restless at night, kicking off the clothes, exposing themselves to the ordinary room temperature, arising from the bed to go to the toilet room, crawling from bed to play during the nurse's absence or during their own convalescence, it has been deemed wise that the temperature be kept at a safely warm point. This decision we have never had any reason to change. It seems grateful to the patients, pleasant to the nurses, and safe to the physicians.

After the child has had a warm bath and is snugly tucked into bed, with or without his chest dressings, the temperature is taken at regular intervals of three to six hours, and upon showing any disposition to rise above 102° or 102½° the child is immediately given another warm bath. This simple hydrotherapeutic measure is ordinarily all that is necessary to obtain a safe degree of temperature in the child. Should, however, the nurse be too busy, or should hot water be not available, or should any other occasion intervene so that it might be impossible or inconvenient to give the child a hot bath, the nurse is allowed to substitute 1 or 2 grains of phenacetin, or other coal-tar product, or a few minute doses of aconite, in order to moisten the skin and reduce the temperature. Beyond this no other drug is given, except that in cases of severe cough small doses of heroin or paregoric are administered, and in cases of sleeplessness Dover's powder or mild bromide mixture is permitted. Careful attention to the bowels and kidneys and skin is always insisted upon. The diet is liquid or soft, nutritious and palatable, and easily digested. Milk is a basis, and cereals and fruit juices are allowed, depending upon the desires of the patient and upon the capacity of the institution.

Should occasion arise in the course of a broncho pneumonia, expectorant mixtures are ordered, and should there come, as there has come in several cases, periods of profound depression and cardiac asthenia, recourse is had to the most vigorous stimulation of the heart and vital centers. Strychnin, quinin, digitalis, and the mild bitters have all been used. When they are demanded they are pushed, if necessary, to the limit. The occasion which would demand such a line of treatment arises

exceedingly seldom. Ordinarily during the course of the disease neither this nor any other drug is given except, as has been said before, to meet some special indication.

Much stress is laid upon dietetic measures. For the first few days of the disease the child can take practically nothing, but after that every effort is made to induce it to take nourishment in some form agreeable to it. The desires of the child are always consulted, inasmuch as we know that where a desire is, digestion is likely to follow. Food which is disliked by the child becomes often nothing more or less than an irritant, or a toxic insert, and consequently it has been impressed upon the nurse that the child should be fed what it reasonably desires, and what it can digest perfectly.

Upon the hydrotherapeutic measures is placed the most dependence. The stimulation of the skin and the vital nerve centers, the sedation of the nervous irritability, the soothing of the wild delirium, and the production of quiet sleep are accomplished largely by this simple physical measure. Care of the emunctories is likewise considered of the utmost importance. All sources of extraneous irritation or overstimulation are discovered and removed. The room is dark or partly shaded, strong lights are excluded, the nurse moves softly, the child is handled gently. The alcoholics are never given except too slight a tendency to recuperate. It would seem from physiological experiment as if alcoholics were always, or almost always, contra-indicated in this disease. In regard to local applications to the chest, to which reference was made in the early part of the paper, there has been, as has been said, a friendly difference of opinion between the two members of the staff. Dr. Douglas has objected uniformly to covering or dressing in the shape of poultices or bandages to the chest, arguing that little was gained by such measures and much lost, that the patient was disturbed by having the dressings changed, and that the examination of the chest by the physician was always interfered with. The argument which appealed to the other member of the staff, Dr. Donald, was the soothing and comforting influence which was secured by such measures, with possibly some concession to ideas which have been in existence for many years. Arguments have been advanced pro and con upon this subject by many physicians and in many medical journals. A settlement of the question seems as far removed as ever. Their patients recovered with the applications and without them; and they find it impossible to say whether the use of such applications has been of value, other than as a salve to the fears and anxieties of the relatives or nurses. It would seem that where there is much pleuritic pain such applications might be of service; and it would appear as if these might be discarded entirely where there was no such indication. It is a question of comfort rather than a

question of cure. Where applications have been ordered, either the quilted or cotton flannel jacket, or the ordinary kaolin preparations, have been used. These latter have been selected in preference to the old-fashioned linseed poultices, on account of their ease of preparation and infrequency of application, a change being made only once in every twelve hours.

PHOTOTHERAPY.

HERBERT F. PITCHER, M.D.

Psoriasis: Abstracts from several communications by well known dermatologists. From the *American Journal of Dermatology*.

The large interest in psoriasis of the general practitioner and the ordinary success that seems to attend its treatment by those not especially equipped to handle diseases of the skin, prompted the editor of the above named Journal to submit the following questions:

- "(1) Is psoriasis a curable condition?
- (2) What remedy is the most successful in its treatment?
- (3) Is diet of a particular kind helpful?
- (4) What may be the prognosis under the best form of treatment and management?
- (5) Is local treatment absolutely necessary? If so, what should be its forms?"

Prof. Burnside Faster, M.D., of St. Paul, Minn., says that while we can promise the patient that if he will adhere faithfully to instructions for a sufficient length of time we can cause the eruption to disappear, there is no drug or other method of treatment known to him which will prevent a recurrence of the disease.

He gives arsenic, preferably hypodermically, in the form of sodium cacodylate for constitutional treatment, and some combination of chrysarobin for local treatment. He believes that the majority of cases do best on a diet from which all nitrogenous elements have been eliminated, and he is satisfied that both alcohol and tobacco are harmful to them.

The local treatment consists of frequent and prolonged hot baths, the use of chrysarobin, salicylic acid, tar and ammoniated mercury in various combinations.

For large and thick obstinate patches of psoriasis he gets most excellent results from the use of x-rays. Local treatment should be persisted in as long as there remains a single lesion on body or scalp.

Prof. Isadore Dyer, M.D., New Orleans, La., says psoriasis is a curable disease. That most of his patients get well, about

ten per cent. are obstinate, and about two per cent. persist in spite of all treatment. He does not claim there is a specific for psoriasis, but cases must be individualized and treated from every point of the patient, rather than of the disease. In his opinion diet does not effect psoriasis in any way, except indigestible food should be avoided. He does not think very much of arsenic except in old obstinate cases with lesions deeply indurated. In his experience he gets as good results from iodides, alkalies, and alteratives as from the much vaunted arsenic. The prognosis in the individual cases in the particular attack should always be guarded. Most cases are relieved of evidences in from six to twelve weeks. His experience is that cases which develop in hot weather yield more readily than those which begin in cold weather.

He thinks local treatment absolutely necessary. Alkaline baths frequently used, with long soaking in the water. Local applications of white precipitate of mercury ointment, salicylic acid in ointment for mild cases, and tar preparation when scaling is emblicated.

Henry C. Baum, M.D., Syracuse, N. Y. Prof. Baum says psoriasis is not a curable disease. While cases may and do recover permanently after treatment and, indeed, without treatment, there is no basis from which to anticipate such results which are exceptional.

All that he has learned that is new or useful concerns x-rays and the salicine type of drugs. He considers arsenic and salicine the most useful drugs. No other cases give such brilliant results as arsenic in suitable cases, where the eruption is not of the inflammatory type for instance. In acute attacks and in old cases salicine works exceedingly well, he thinks. He considers diet an important element in the treatment of the disease; while a meat free diet is often a benefit, there is no fixed diet for psoriasis. Whatever tends to the conservation of the well being of the psoriatic patient, furnishes the key to the best handling of such cases.

He thinks local treatment not absolutely necessary in all cases. Some chronic patches may persist as plaques or as segments of the margins of lesions, which may require local treatment for their removal. X-rays in selected cases do better than any other form of local treatment, if skilfully and cautiously given. He uses chrysarobin, pyogallol beta-naphthol, salicylic acid and tar; with various other drugs.

Ralph Williams of Los Angeles, California, has come to the conclusion that psoriasis is chiefly of constitutional origin, and based upon some fault of metabolism, and is concerned with the entire constitution of the individual affected. He has found no one remedy to be relied upon. He uses drugs which act as chologogues and tar locally.

Diet is particularly useful, especially in the full-blooded, florid type, who is a generous consumer of nitrogenous foods. Strict elimination of these articles from the diet is necessary. It is his habit to use local remedies, but he has known patients with mild attacks to clear up without local medicinal treatment, yet at the same time they were under the influence of sea-bathing and plenty of sunshine.

Prof. Andrew P. Biddle, M.D., of Detroit, Mich., thinks so much depends upon the usually associated dyscrasia or pernicious habits that the patient's relief depends very much upon the correction of these underlying conditions.

Arsenic is the drug of choice for internal administration, in young subjects and all early cases. While in long standing cases thorough elimination and alterative treatment with potassium acetate and potassium iodide give best results.

Locally he uses chrysarobin for the body and salicylic acid for the scalp and finger nails.

He uses applications for a few seconds of the solid carbon dioxide where there are many small lesions, securing a disappearance in less than a week.

SERUM THERAPY

EDITED BY I. O. WOODRUFF, M.D.

Dosage of Gonococcus Vaccine and the Remedial Measures to be Used with It.

W. R. Jamison, in Vol. 25, pp. 311-315 of the *Therapeutic Gazette*, lays down broadly the principles that many failures in the use of the vaccines in this affection come from the usage of too large doses in acute cases and too small in chronic cases.

To show the successful employment of this agent he quotes Hartwell ("Treatment of Gonorrheal Arthritis with Vaccines Made from the Gonococcus," Transactions of the American Urological Association, 1909), who cites 51 cases treated in this manner and with a large percentage benefited and cured. Hartwell employed 10-25 million to each dose in acute cases with intervals of two to four days between injections, and 500 million in the chronic cases with intervals of five to seven days between injections. In his cases 86 per cent. were of the poly articular type.

He also cites Ravogli, *Lancet Clinic*, May 1908, who employed this measure in gonorrheal arthritis. In one case his initial dose was 200,000,000. This in one hour brought the temperature from 98 to 100° F. and increased the urethral dis-

charge. In four days a repetition of the injection caused less reaction, while a third dose caused no reaction. A cure was effected with no influence on the urethral discharge.

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERICK DEKRAFT.

The Treatment of Hypertension Resulting from Alcoholic and Other Excesses by d'Arsonvalization. By William Benham Snow, M.D. (*The Monthly Cyclopedic of Medicine*, August, 1910).

Dr. Snow says: "There is probably no condition that causes more deaths after sixty years of life than arteriosclerosis and its consequences—nephritis and apoplexy." Until recently Bright's disease was believed to be the cause instead of the consequence of arterial degeneration. The origin of this is traceable to a form of auto-toxemia of intestinal origin, also to alcohol which introduces a noxious element into the blood stream and deranges gastric digestion. It is rare to find a man past 40 who has indulged in the free use of malt liquors with a normal tension. It is probable that the excessive use of meat also plays an active part in the production of and introduction into the gastro-intestinal canal of the germs which cause the toxæmia and which in turn causes the arteriosclerosis. Syphilis is also a cause of arteriosclerosis.

The prognosis depends upon the individual self-control, the stage to which the process has advanced, and the regimen adopted. "The causative relation of hypertension to degeneration is largely due to the fact that muscular structures in a state of tension cease to take on nutrition. While the tension is moderate, sustaining a pressure below 150 mm. of mercury, the degenerative process is not so marked, unless of long standing; with a tension continued at 150 mm., the lesion may be well marked. The promptness with which the tension falls to normal by d'Arsonvalization, and the ease with which it is maintained, at normal by diet and exercise, is an index of the stage to which the process had advanced."

The blood tension is lowered without depressing the action of the heart when the auto-condensation method is employed.

"The only contra-indication so far recognized for the employment of auto-condensation is noted in the management of cases in which intervening resistance is to be overcome, as in parenchymatous nephritis."

A sphygmomanometer is absolutely necessary if we wish to form an accurate conception of the blood pressure. In prac-

ting auto-condensation the patient should be placed on a couch, having a cushion the full length, and long metal plate beneath; this should be connected to one end of the d'Arsonval apparatus. The patient should receive the current preferably through the hands, from two electrodes connected with the hot wire meter, which is in series with one side of the d'Arsonval apparatus. 350 to 500 milliamperes given for from 12 to 15 minutes should be the dosage. While there are other measures such as the light bath, the baking process, the hot bath and the Nauheim treatment which are useful, none produce such lasting effects as do high potential electrical currents.

The diet regime consists in the avoidance of all red meats and at first of fish and fowl as well, abstinence from all alcoholic drinks and sometimes the use of milk prepared with lactic acid ferments.

Dr. T. C. Low speaks of *The Action and Uses of the High Frequency Effleuve* in the *Pacific Coast Journal of Homeopathy*. He employs the bipolar method, connecting the couch to the one pole of the apparatus (presumably the d'Arsonval).

He says: "The effleuve obtained from the top of the Oudin resonator or one pole of a Tesla coil is a purple brush discharge, consisting of alternating streams of electrical particles moving with enormous rapidity and momentum. The molecular bombardment of the skin produces an intense sensory impression upon the skin, like unto a warm breeze or a rain of miniature hailstones, which, when the electrode is brought nearer, becomes a shower of fine sparks, which may be carried to the point of blistering. There is first a contraction and then dilatation of the superficial capillaries, producing a diffuse redness of the skin. Ultra-violet radiations are given off and ozone and nitrous oxide are produced, the ozone being absorbed to some extent, and together with the nitrous oxide has a decided antiseptic effect locally."

The effleuve relieves congestion, stimulates nutrition and increases the activity of the vasomotor system and trophic nerves. Another effect of the effleuve results from the ionic bombardment of the treated surface and is of a stimulating counter-irritant nature.

The third effect is due to the ozone and nitrous oxide produced and driven into the superficial tissues. "The germicidal effect of the effleuve on septic ulcers, pyogenic infection and parasitic skin diseases is no doubt largely due to the production and diffusion of the above gases." The effleuve is of great service in chronic indolent ulcers and various skin diseases, old varicose ulcers have healed under the influence of the effleuve, also chronic eczema, psoriasis, acne, seborrhoea, and alopecia. "A fine soft spray is soothing and curative in neuritis and neuralgia."

It relieves the soreness of sprains, rheumatism, torticollis and lumbago; also gout of the hands and wrist has been promptly cured.

In pulmonary tuberculosis the effleuve increases the respiratory capacity, "diminishing the frequency of respiration." The hemoglobin and the number of red cells are increased, and when in excess there is a diminution of white cells. The natural protective agencies are stimulated. The strength, sleep and appetite are improved.

Low says effleuvation of the spine causes a raising of blood pressure, due to contraction of the superficial capillaries.

So much has been said of the beneficial effects of ozone and nitrous oxides when applied to diseased conditions that it seems timely to sound a note of warning to those engaged in the extensive use of high frequency high potential currents. The inhalation of excessive amounts of ozone and nitrous oxide is extremely irritating to the respiratory passages and to the lungs. Care should be taken to insure fresh air by working in large rooms, well ventilated. Those employing static machines capable of producing currents of the greater amperage and voltage should see to it that the interior of the machine is perfectly dry first because the current produced is better and of greater volume if the machine is dry; second because if considerable moisture has collected in the interior of the case another element of irritation is produced by the brushes on the plates of high power static machines for nitrogen and oxygen in the presence of water give ammonium nitrate when exposed to ozone. All this vapor is driven out of the case by the currents of air set up by the rapidly revolving plates of the machine and when inhaled for hours at a time during the course of an urgent practice, may in the course of some months or years be productive of a general feeling of debility and chronic ill health.

Frequent airing of the interior of the machine, working in well ventilated rooms with frequent changes of the air by opening the windows widely, will obviate this. What is true of static machines is also true when extensive use is made of the effleuve from either coil source or from a step up transformer. If ozone and nitrous oxide permeate the room it will combine with other substances in the air of the room such as carbon monoxide, and may add by reason of these compounds another element dangerous or at least be detrimental to the health of the operator. [F. DE K.]

RADIOGRAPHY.

EDITED BY FREDERICK M. LAW, M.D.

The Effects of the X-Ray Upon the Operator. By J. N. Scott, M.D., Physiologic Therapeutics.

Dr. Scott has written this interesting article from personal experiences and it is of such an instructive character that it will be quoted in full.

"I commenced to use the x-ray in 1897. For four years I worked around the active tubes every day and never received a sufficient dosage to produce an active burn, but at the end of this time, I noticed that the skin on the back of my hands commenced to discolor, thicken and become sensitive to heat and cold. I was accustomed to use the back of my hand in front of the fluoroscope as an index to determine how the tube was working. About this time a number of operators were being affected. We were warned that it would be a good policy when operating the tube to remain back of the anode and not expose ourselves to the active part of the tube. I heeded this warning and my conditions remained stationary for about six months, when I noticed that my nails were beginning to crack and my hands were getting a little worse. I then had a steel screen constructed one-eighth of an inch thick, three feet wide and six and one-half feet high, with a glass window 4 x 6 inches. I remained back of this screen a good part of the time, but still continued to make fluoroscopic examinations when it was necessary. I continued to use this screen as a protection for another six months, when I found myself becoming nervous, having indefinite pains in the abdomen and occasionally vomiting and feeling bad generally. I tried to make myself believe that I was a neurasthenic but finally became convinced that many of the symptoms were due to the x-ray. At the same time my nails were atrophying some, and the thickening of the hands still increasing. I then had a metallic box constructed with an adjustable opening in the side and bottom for the x-ray to pass through. This box was large enough so that the tube could be placed inside of it and unless the vacuum was too high the current would pass through the tube and not jump to the box. I had this box suspended from the ceiling by pulleys and counterweights by means of which I could raise or lower it over a patient. I still continued to use the fluoroscope for diagnostic purposes, but remained back of the steel screen when it was not necessary to adjust the tube, etc. In this way I had the protection of the metal in the box and the steel screen most of the time and was really exposed to the x-ray but a short time each day. In spite of these precautions, I developed an aching in the bones and pain of short duration

in different nerves, which I supposed was neuritis. And in talking to a number of older operators, both in this country and in Europe, I find that they have the same symptoms and like myself believed them due to the x-ray. I continued using this protection for several years. Finally several necrotic patches developed in my hands, but I was always able to have them heal in from two to four weeks. Later I became so susceptible to the ray that I gave up using the fluoroscope entirely, even with the aid of the heavy glass over the screen, and wearing special rubber gloves with metals, such as lead, incorporated in the rubber and heavy lead glasses for the eyes. I found that remaining in the field of the active x-ray tube for one minute would affect me more than exposing myself hours would a few years before. I then obtained assistance to operate the apparatus and I have not seen the x-ray tube in operation for several years.

In applying treatments I examine the patient, give the time of exposure, penetrability of the ray and area to be exposed to the assistant who applies the ray. I remain in a room some distance from the x-ray room, separated from it by heavy walls which are covered with steel. My condition is about the same that it was three or four years ago, but my hands have not improved materially."

In summing up his conclusions, Dr. Scott says: "I believe that every operator should have sufficient protection that he can carry a small photographic plate in his pocket for half a day and upon development find that it has not been fogged."

Roentgenographic Examination of the Bladder. By John M. Garratt (*The Journal of the American Medical Association*).

Dr. Garratt employs a suspension of bismuth as an injection in the bladder to obtain a shadow for a radiogram in those cases where it is not advisable to use a cystoscope. His technique is as follows:

Pass a sterile, soft catheter and irrigate the bladder with boric acid solution. When the washings come away clear, measure its capacity, with the bladder empty, distend with the measured quantity of the following solution:

Bismuth sulcarbonate, Gm. or CC.....	50.
Kaolin.....	250.
Aqua distil.....	1000.

(Formula of Dr. Kaemisch of Hamburg.)

Take at least two Roentgenographs, one in the ventral recumbent position, with the anode centered over the sacrococcygeal articulation; this should be a standard exposure

for the bladder, always preserving the same distance from anode to plate. Center as above and a Roentgenograph will result from which reliable comparison as to size, position and conformity can be made. The second exposure can be taken at any desired lateral or dorsal angle.

Solution of argyrol and collargol has been used for injections in examination of the urinary tract with fair success by several radiographers in this country and abroad. In one case Dr. L. G. Cole of New York inflated the bladder with air and showed a very clear outline of the bladder and also of an enlarged prostate gland.

The Roentgen Ray as a Means of Diagnosis of Carcinoma of the Stomach and Bowel. By Dr. G. E. Pfahler (*Medical Record*).

Dr. Pfahler has written an excellent article explaining fully the technique and diagnosis of this most difficult as well as most dangerous use of the Roentgen ray.

He considers the fluroscope an indispensable instrument for stomach work and describes his means of protection on himself very thoroughly. I have seen his protection chamber and it is as perfect apparently as it is possible to make it. A feature absolutely necessary in the light of the sad histories of a number of well known operators.

Dr. Pfahler says: "When loss of appetite (without any change in habits), distaste for meats, inability to digest solid foods, pain in the region of the stomach or tenderness in the region of the umbilicus develops in a patient past forty years of age, we should at once become suspicious and the examination for carcinoma of the stomach should be made at once.

"The value of this method of diagnosis depends upon the fact that carcinoma modifies the outline, position, or lumen of the alimentary canal, or interferes with the peristaltic waves, the motility of any part, or obstructs the passage of food. The earliest evidence will be some interference with the peristaltic waves and even in the stage of a small ulcer it may cause a spasmodic constriction."

Dr. Pfahler uses the bismuth in the preparations of fermented milk such as kefir, firmilac, koumiss, etc. It holds the bismuth in perfect suspension and is easily digested.

"1. He believes that a positive diagnosis can be made in nearly every case in which an indurating carcinoma is present.

"2. In some cases in which good peristaltic waves are present a negative diagnosis can be made. •

"3. A positive diagnosis depends upon some interference with the peristaltic waves, some encroachment upon the lumen

of the stomach, some interference with its motility, or some interference with the functions of the pylorus. These may occur singly or combined.

"4. He believes that nothing short of an explanatory operation will give nearly as much positive and definite information, though other physical and chemical examinations should not be neglected.

"5. Examinations and interpretations must be made by an expert to be reliable and safe to the operator and patient."

BOOK REVIEWS.

MODERN TREATMENT THE MANAGEMENT OF DISEASE WITH MEDICINAL AND NON-MEDICINAL REMEDIES. In Contributions by American and Foreign Authorities. Edited by Hobart Amory Hare, M.D., Professor of Therapeutics and Materia Medica, Jefferson Medical College, Philadelphia, and Physician to the Jefferson College Hospital, Assisted by H. R. M. Landis, M.D., Director of the Clinical Department of the Phipps Institute (University of Pennsylvania); Visiting Physician to the White Haven Sanatorium. In 2 Volumes. Volume II. Illustrated. Lea & Febiger, Philadelphia and New York.

Volume II. of this valuable work is devoted essentially to therapeutics, and is compiled by leading authorities both in this country and abroad. The work is divided into nine parts devoted to the treatment of Diseases Due to Parasitic Infection, of the Circulatory System, of the Digestive, Respiratory and Nervous Systems, Nutritive and Dietetic Systems, Diseases of the Genito-Urinary Apparatus, Diseases of the Skin, Eye, Ear, etc. These various departments are ably treated by specialists in each of the departments. Gottheil in his "Treatise on Syphilis" has been thoroughly scientific. McKenzie in his consideration of the cardio-vascular diseases has treated the subject in a thoroughly up-to-date manner, but has not recognized the importance of the d'Arsonval method. He calls attention however to the shortcomings of the claims of Schott and his followers at Bad Nauheim. Every effort has been made by the compilers to include in this volume all the up-to-date methods. The shortcomings of the work will be found in the consideration given to the modern employment of physical therapeutic measures. Like most writers to the present time, the knowledge of electricity and radiant light and other physical measures falls short as compared with the results obtained by those familiar with these

methods. The work is well illustrated, printed on excellent paper, and published in the characteristic good style of the publishers.

* * *

MAKERS OF MAN. By Charles J. Whitby, M.D. (Cantab), Author of "The Logic of Human Character," "The Wisdom of Plotinus," etc., etc. With 47 half-tone and other plates. New York, Rebman Company, 1123 Broadway. Price, cloth, \$3.

The plan of this volume is interesting. The sub-title is "A Study of Human Initiative." It is an essay in inductive psychology, using as material the lives and characters of forty famous leaders of mankind. The sympathy of the majority of those who will read this production is enlisted at the start by the author's designation in the Preface of man as "a self-determining spontaneity;" also saying that "the demonstration of the predominance of a super-mechanical, super-physiological spontaneity in the determination of human careers" is "the main result of his inquiry." Instead of "the Unknowable" at the center of things Dr. Whitby suggests that the whole process of evolution may be but "a manifestation of individualities and of individuality in general; that the individual is perhaps not the creature of evolution, but evolution the self-display of the individual." The author classifies men as æsthetic, intellectual and ethico-religious. It seems hardly in place for a writer on psychology to affront the most sacred belief of many of his readers in the central doctrine of Christianity—namely, the divinity of Jesus Christ—by so bitter a paragraph as that on page 406. Besides the accumulation of interesting facts concerning forty great leaders the chief value of this work lies in its defence of the reality of personality, of the freedom of the will, of the actuality of the experiences of choice and volition, or, in other words, of genuine individuality.

* * *

A RADIOGRAPHIC ATLAS OF THE PATHOLOGIC CHANGES OF BONES AND JOINTS. By Amedee Granger, M.D., Lecturer on Radiology and Electro-physics, New Orleans Polyclinic; Physician-in-Charge of the X-ray Department of the Charity Hospital; Associate Editor of the *Journal of Advanced Therapeutics*; Member of Societe Francaise d'Electro-therapie, Paris. New York: The A. L. Chatterton Co. Price, cloth, \$6.

There has been a demand for a work of this kind. The author has attained his ambition "to prepare a work that

will prove of valuable assistance to the surgeon, physician, and x-ray operator with limited experience and facilities in interpreting skiagrams," for the work fills just this place, and in a most practical manner, comprising as it does seventy-eight plates made from a collection of superior radiographs such as have not been shown in any similar publication to the present time. The author has given not only plates showing diseased or fractured bones, but also a set of radiograms showing the normal bones in their normal position. In the Introductory Chapter the author has presented a carefully prepared set of Rules for Interpretation of Skiagrams. In the Chapter on Skiagraphy appears a very carefully prepared technique with a Table of Comparative Exposures and examples which will be of inestimable value to the beginner. The work is so arranged that the description of each plate is opposite the skiagram which makes convenient the study of the skiagram in relation to the text. The excellence of the author's work and the careful manner in which the publisher has prepared the volume printed upon the best quality of coated paper and bound in fine cloth, is commendable. It is the most valuable work of the kind yet produced; and will be of inestimable value to both the novice and expert radiographer. The author and publisher are to be congratulated upon the general excellence of the work.

NEW APPARATUS.

A NEW X-RAY TUBE HOLDER.

The engraving on the page following portrays a new x-ray protection tube stand. It has many excellent features, the greatest being that it affords absolute protection to the operator as the tube is enclosed in a half-inch thick lead glass protection shield.

The apparatus has a compression diaphragm and the secondary rays are, therefore, largely absorbed.

The stand is mounted on a heavy base equipped with ball-bearing rollers. Adjustments at any angle or height are easily accomplished. For treatment work the stand is an excellent addition to the equipment of the progressive practitioner.

It is manufactured by the Scheidel-Western X-Ray Coil Co., Chicago, Ill., and is sold for \$50.

NEW SCHEIDEL-WESTERN X-RAY
COIL.

NEW VICTOR HIGH FREQUENCY
APPARATUS.

A NEW HIGH FREQUENCY APPARATUS.

Within the last four years the Victor Electric Company have placed upon the market six different styles of high frequency apparatus that have been a pronounced success. When the range of the various machines was considered, however, there seemed to be a rather wide gap between two of the larger outfits, and it seemed desirable to fill this gap, to meet the demands of a broader field.

No doubt there are hundreds of physicians who have bemoaned the fact that they were unable to procure an apparatus from which a satisfactory auto-condensation current could be derived, without installing an elaborate outfit, because in a great majority of instances this apparatus duplicated certain modalities which the doctor found already available.

To meet the conditions aforementioned, and to make the line as complete as possible, the Victor Electric Co. of Chicago have placed their No. 7 high frequency outfit on the market.

This apparatus delivers the various modalities obtainable from the Oudin, Tesla, and d'Arsonval high frequency currents, amongst which might be mentioned vacuum electrodes spray or effleuve, fulguration or convective discharges, auto-condensation and ultra-violet lamp current, and x-rays sufficient for all therapeutic and light radiographic work.

The auto-condensation current from this outfit delivers sufficient volume of current for the most profound constitutional effects.

The outfit, as shown in the illustration, is entirely self-contained. When operated on the alternating current, it will only be necessary to connect to the lighting circuit. Where the direct current only is available, a small rotary converter is supplied.

The manipulation is so simple that anyone can learn to operate it in less than fifteen minutes' time.

The No. 7 outfit will appeal to x-ray operators who are contemplating the installation of x-ray and high frequency apparatus because the outfit is entirely self-contained, delivering x-rays for all of the treatment work, the radiographic equipment is saved for the heavy work for which it was primarily intended.

Another point in favor of this outfit is that it has a greater range and volume of current than is obtainable from many high priced resonators.

Further particulars may be obtained by writing to the Victor Electric Co., 55-61 Market St., Chicago, Ill.

* * *

THE UNIPULSATOR.

The principles of the "Unipulsator," as now combined in this apparatus for the production of x-ray and high-frequency therapeutic currents, are entirely unique and distinct. They are purely scientific and are applied in their simple forms. The flexibility and capacity to give such a wide variation in characteristics and potencies of electric current are obtained by utilizing and varying the proportion of inductance and resistance, frequency, potential and density, all of which are separately controllable and easily adjustable.

The component parts of the apparatus include a *closed* magnetic-circuit step-up transformer, a polarity reverser (or "alternator"), driven by a small motor actuated from any ordinary current supply, and a large capacity condenser, together with the inductance regulator, condenser regulator, "alternator" speed regulator and primary current rheostat.

It is the specially arranged inter-relation between these that produces the "Unipulsator" currents to which reference is made.

The large scope of frequencies and voltages available is under the easiest possible control of the operator. With other types of transformer and coil apparatus the range of frequencies is approximately from 30 to 70 per second, whereas with the "Unipulsator" the range is 30 to 600 per second; the possibilities of such a widely adaptable working medium for High Frequency treatments will be obvious. The reactance of the condensers in the "Unipulsator" multiplies the number of active impulses from 5 to 20 times, thus giving a possible range of over 12,000 per second; this range can be still further increased if required for special purposes, but for ordinary practical purposes it is sufficiently high. The range of voltages is from 5,000 to 500,000. The maximum current varies with the size of apparatus, the $4\frac{1}{2}$ K. W. size dealing with a primary current of 40 amperes on a 110-volt supply. With this construction, however, the capacity could be very easily increased to 200 or 300 amperes if necessary for special purposes.

For auto-condensation, Oudin effleuve, direct transformer waves and other variations of high-potential, high-frequency electric treatment, the "Unipulsator" is universal in its applicability.

For operating x-ray tubes, the peculiar characteristic of the current induced gives a steady even glow without the vibratory intermittent effects of low-power transformers and coils. This most important feature will specially appeal to experienced radiographers, because it will be understood that the extremely high pulsation frequency attained produces a much greater volume of x-rays, thus giving the effect of a dense and apparently constant "illumination" of the tube. By the same means, a more clearly defined and steadier image is obtained in a fluoroscopic examination: The certainty of location and general diagnosis is increased enormously in the steadier glow. The absence of the tube-destroying inverse currents means that tubes will last much longer and enable the operator to preserve his more precious "seasoned" tubes which, the more seasoned they become, are the more liable to spoliation by "inverse" influence. The importance of the greatly extended range of power and fine adjustment for x-ray work cannot be too forcibly insisted upon. The operator can tune the apparatus to any pitch for soft or hard tubes, and the term to "tune the apparatus" is correct literally and practically, because the currents of the "Unipulsator" can be adjusted to produce "sparks" or effleuve with distinct and sonorous notes, which the operator quickly learns to harmonize with his requirements.

Flexibility and refinement are outstanding features of this

apparatus, the enormous advantages of which over the rule-of-thumb, trial-and-error limitations of the coil and other transformer equipments hitherto available, will be patent at the first operation. For research, it is especially valuable and we are happy to be able to place such a medium within the reach of the physician operating in this field.

The result of actual working tests shows that the "Unipulsator" can be run at its full normal load continuously, and this without undue heating and without varying the current volume, potential or character. This means that a busy operator can utilize the apparatus all day without in any way taxing it, and with as good effect at the last as at the first.

It follows from what we have already said that fine technique can be easily acquired within a very short period and, what is more important, a method of systematizing dosage is available, because instead of trying to fix a standard by means of a given spark-gap, direct readings of the primary and the applied currents are taken from the meters provided on the apparatus, and the current, potential and frequency being in proportion to the readings of the indicators, the dosage can be adjusted by means of the rheostat and switch control to any prearranged value or to any point recorded on meters at previous administration.

The step-up-transformer construction is quite special, no ordinary form being of any use for our purpose. The core is so designed as to give the greatest possible efficiency—this being the power to deal with large currents without heating and with little magnetic loss. The windings and insulation have been most carefully worked out and have withstood the severest tests.

The current reverser (or "alternator") is quite new and as now embodied is simple in form, but the greatest possible care, good material and finest workmanship are necessary in construction, its function being to deal with considerable current and this, for some of its combinations of factors at a very high speed.

The condensers are specially constructed. No similar type of condenser hitherto produced would be capable of dealing with the current capacity of the complete "Unipulsator." Unique plant and machines for manufacture have been designed and built by us to make possible the condenser improvements that have been imported into the apparatus.

The cabinet is of panelled and polished hardwood, to reasonable selection of customer as regards particular wood. The stock standard is of mahogany, which we specially recommend.

The whole construction is of the best material, method, and workmanship throughout. Nothing has been sacrificed

to effect saving in cost. The manufacturers have been careful in construction, so as to run no risks.

The appearance is substantial and chaste. The small moving parts, while being thoroughly accessible to the operator, are

entirely invisible from the front of the case. The cabinet is such as might be expected to be found in the sanctum of a refined practitioner, and there is nothing about the apparatus that suggests mechanical and electrical "machinery."

It will be understood that a closed-circuit transformer being used, there is *no interrupter* in the apparatus, and there is no motor-generator. There are no chemicals or fluids of any sort. The only oil used is that in the bearings of the mechanical parts of the small motor and current reverser, which (combined on a single shaft) are perfectly simple.

This apparatus is manufactured and for sale by the E. B. Meyrowitz Company, 104 East 23d St., New York.

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ERRONEOUS NOTIONS LEAD TO ERRONEOUS EXPRESSIONS.

MANY terms and expressions creep into medical literature which are not technically scientific; and many of them are not to be excused from any point of view, because they are misleading.

To speak of the Roentgen ray as "*Roentgen light*" or "*x-light*," because it represents a form of ether vibration, is an error which is misleading and unscientific. The x-ray produces no light except by fluorescence; a secondary radiation or emanation from some body upon which the rays fall; whereas light is defined as "that which makes things visible." In other words, it includes only the rays of the visible spectrum. To speak of radiant "light" singly, except the associated frequencies at the ends of the spectrum are filtered out, is to misconstrue the physical conditions present in the radiations proceeding from the sources of light. The infra-red and ultra-violet rays which are not of the visible spectrum and therefore are not light, produce effects varying in degree, intensity and consequently in effect, from the visible spectrum. Radiant energy varies in its penetration and heat production, with the wave length. Hence the lower rates of vibration or frequencies of the spectrum, and the infra-red, also called heat rays, produce the maximum heating effects, and are consequently much more energetic in the induction of hyperemia than the rays of higher frequency.

These lower frequencies or infra-red radiations produce no visible radiation and though always present are not included in the light or visible spectrum.

The ultra-violet which penetrates the least produces little or no heat and consequently no deep hyperemia, but has the greatest effect in destroying germs in fluids through which it passes readily, is not included in the visible spectrum. Nor is it energetic in its effects upon the germs in the human body, not penetrating to any depth into the skin; it being entirely absorbed in the outer layers. No vascular tissue is penetrated by the ultra-violet radiations of the solar rays, or the rays from the electric arc. Its therapeutic effects, then, are only due to its influence upon the external layers, and of least consequence in the induction of heat effects.

These marked differences of effects, associated with the expression "*light-therapy*," is very misleading to the student of therapeutics. If in the nomenclature the designations were made with reference to the invisible and visible spectrum, including with the expression of the effects of light the coincident effects of the higher and lower frequencies distinctly designating them with reference to the effects produced, as of *radiant light and heat* when the ultra-violet is filtered out, and as *radiant energy* when all the frequencies are included, a fuller significance would be implied.

The term *violet rays* is another misleading expression which is creeping into current medical literature, and is on the lips of nearly all novices who are beginning to use electrical currents of high potential. The use of this expression implies that the therapeutic effect is due to the radiant frequencies induced in connection with the electrical manifestations, whereas these are of the least significance. The electrical effects of heat, with the induction of hyperemia and stimulation from the local and transmission effects of the electrical current are entirely forgotten by these novices, who are most of them physicians who would be ashamed to be called electrotheraputists. It is these physicians who adopt the use of electricity in an irregular and unscientific way, with little or no conception of its properties or indications, who make these misleading statements, and employ these terms unscientifically.

USE OF ELECTRICITY IN DIAGNOSIS OF REACTIONS AND CONDITIONS.

IN a large percentage of so-called works on electro-therapeutics much space is devoted to so-called testing of the normal and degeneration reactions. These tests are of so little importance compared with the therapeutic value of electricity as understood by those who are well informed, and furthermore they are so unreliable in a large percentage of cases, that they should be treated only in works on diagnosis with exceptions and not exclude the more valuable considerations of electro-therapeutics. It has been often demonstrated by those familiar with the modern physical treatment of nervous diseases, that the so-called reactions of degeneration are in many cases unreliable, the conditions so diagnosed being later restored to normal. The section of a nerve, or a process which impairs the function of a nerve in the path between the periphery and the center, is as certain to cause it to fail to respond to the reaction, as if the center itself were destroyed.

There are other points of diagnosis with electricity which are not mentioned by most of these writers. The diagnosis of a local inflammation, as of a local neuritis, or of a local muscular contraction by the pain induced by applying the static wave current spark, or other modality which produces mechanically contraction, to such an area, is not recognized by those who are unfamiliar with these effects. Likewise the anesthetic areas of the skin, tested formerly by bringing metal points in contact with the surface, are more readily diagnosed and the contrast with normal areas are more easily determined by the application of static friction sparks over the clothing; when it is possible to discover the characteristic areas of anesthesia associated with cord lesions as tabes dorsalis, and readily note the extent of such areas. The use of high potential currents in the diagnosis of reactions of degeneration, in the form of condenser discharges, which is practically the same as the static method described, has received little attention until in a recent work.

THE DISPOSITION OF THOSE WHO USE THE ROENTGEN RAY IN DIAGNOSIS AND THERAPEUTICS TO IGNORE ELECTRO-THERAPEUTICS.

THE timidity of medical men who are beginning the use of electricity as displayed in their fear to express their views before a mixed body of physicians, is an evidence of lack of moral courage which should never be displayed by the man who knows that his views and standpoint are correct. Great is the need at the present time of breaking down the prejudice of the medical profession to subjects with which most authorities of the rank and file are ignorant.

The Roentgenologists who have used the x-ray either for purpose of diagnosis or therapeutics, have been inclined to place themselves in opposition to the use of electricity with other methods. Many of the men have carried this to the extent of being snobbish, causing them to appear ridiculous to those who know their value. They in this way have assumed to place themselves in a different class, as though the rank and file of the medical profession would look upon the use of the Roentgen ray as of a higher order than the other therapeutic uses of electricity, whereas if they would employ electricity intelligently from all points of view, they would soon become convinced that the x-ray filled only a minor role in therapeutics. A few of the broad gauged men among the Roentgenologists have embraced in their work not only the x-ray, but have included the other uses of the high potential currents, which they have found as previously stated, to fill a wide scope of therapeutic utility.

In the May issue of our contemporary, the *Archives of the Roentgen Ray*, in the editorial, the following statement is made:

"It is unfortunate that most of those who have taken up electricity in its medical aspects devote their energies mainly to Roentgen ray work, and especially to radiography. No doubt this is determined in great part by considerations of supply and demand, and by the ease with which the mechanical art of radiography can be acquired, provided the apparatus is forthcoming.

"We cannot help thinking that there are some grounds for

regretting this wholesale diversion of electro-therapeutists into the channel of radiography. Even if the older branches of electro-therapy appear to be less fruitful in immediate profit, it still remains certain that further investigation into the effects of electrical currents upon living tissues must in due time yield results quite worthy of attention. We think it would be to the advantage of the younger men if they would once again work over the ground of electro-diagnosis, or would attack some of the problems of ionic medication with originality and vigor."

It would not be even necessary to limit the work of these young investigators to the employment of electro-diagnosis and ionic medication. If the writer of this editorial had himself been familiar with the uses of the high potential currents, including the application of the static and high frequency currents to therapeutics, he would have included them in his appeal for the broader conception of electro-therapeutics and thereby have promoted a much wider recognition of important methods which have not been generally appreciated either by the Roentgenologists, or most of our other foreign contemporaries.

In America these methods are beginning to be accepted, and numbers of men who are authorities on other subjects, are beginning to endorse them as already developed. Unfortunately, many American physicians expect that the new things of value in electro-therapy must come from abroad, whereas those who have kept pace with American progress, while acknowledging all the advances of their foreign contemporaries, have not been slow in grasping methods originating at home, thereby advancing the principles of electro-therapeutics in channels which have to this time received very little recognition abroad. Particularly is this true of the uses of the static current which must ultimately occupy in the minds of the profession everywhere, a very large measure of confidence, as accomplishing many effects not possible to derive from other electrical currents. The time is not far distant when it will be no disgrace to stand before a body of physicians and sustain the things already demonstrated in electro-therapeutics. Until then, however, it will require the courage of the pioneer in any new scientific field.

CHILD WELFARE MOVEMENT.

ONE of the most deserving movements at the present time awakening the interest of philanthropists throughout the country is the Child Welfare Exhibit, the first of which was held in New York City during the months of January and February. The object of these exhibits is to dispel ignorance, and fix the attention of parents and educators on the child where attention and work will count for the most. Such an exhibit is at present on view in the Chicago Coliseum, and will be later held in St. Louis, Pittsburg, Newark, N. J., and afterwards in Montreal. Great emphasis is placed on the health of the child from its birth. The idea back of these exhibits is to awaken the cities of our country to a consciousness of their responsibility for the welfare of their children.

The unique thing about the exhibition is, that for the first time there is shown a cross section, so to speak, of city life as it affects children, and its connection with various phases of home life; the streets in which children spend so much of their time, their recreations and amusements, their schools, and the work children do to assist their parents in earning a livelihood. It is clearly shown that the small earnings made by children in this way are costly in the end. What the city provides in the way of schools, libraries, museums, parks and playgrounds, and public and court protection is shown, as well as what benevolence is doing through the churches, philanthropic organizations, settlements, associations and clubs.

The work is a most commendable one, both from the civic and philanthropic point of view, laying foundations as it does for healthy and moral existence.

Like all other philanthropic enterprises, this must be supported by public spirited individuals; and so much has already been accomplished, that the cause well merits the confidence of every community.

A NOTEWORTHY CASE OF SCIATICA.

BY J. WILLARD TRAVELL, M.D., NEW YORK, N. Y.

In many diseases the relief afforded by a few properly administered treatments by a chosen electrical modality or other physical agency is so prompt and complete that neither the patient nor the physician can fully appreciate the measure of suffering and duration of illness which might have ensued under less efficient methods of treatment. This is especially true of the acute cases of myalgia, neuralgia, neuritis, sciatica, herpes zoster, and acute gonorrheal epididymitis, which are so commonly entirely relieved in from one to half a dozen treatments.

The case of sciatica here reported could undoubtedly have been relieved in the acute stage more readily than after the lapse of nine months; months in which the condition passed from the acute to the chronic and in which the patient's general condition became worse rather than better. It is of especial interest because of the severity of the case, the failure to improve during nine months of skilful medical and surgical treatment, the last three months having been spent in one of our best hospitals, and because of the rapidity and ease with which it finally yielded to electrotherapeutic treatment.

The case is that of Mrs. D. K. and the history is as follows: Age, 32. Dressmaker or saleswoman. Mother died of apoplexy; father, two sisters and one brother living and well; a brother and sister lost in infancy. She was twice married; to the first husband fifteen years ago for two years and to the second five years ago for three years. By the first husband she had one child; by the second none, and has had no miscarriages.. Her menses began at thirteen and were always irregular, moderately painful and moderately profuse. Three years ago she had a successful operation for right inguinal hernia. She has had no other illness and never before had sciatica. She takes three or four glasses of beer a day at times, but no whiskey.

The present illness began March 15, 1908, when on carrying a basket of clothes and in the act of stepping over a box, a severe pain suddenly shot up the right leg and spine to the head, since which time there has been continual pain in

the leg from the sciatic notch to the ankle, the pain being worse at night and aggravated by lying down. From March 15th to December 5th she never spent the night in bed except for a time following an abdominal operation done November 4th. She was in Bellevue Hospital from July 7th to July 12th, and for the rest of the time received private treatment until her admission to the New York Hospital, September 8th, 1908, where she remained until December 3d, 1908, receiving faithfully treatment by counter irritants, massage, cautery, cold applications, alternate hot and cold applications, "baking," cabinet light baths, Scotch douches, and finally, on November 4th, all measures having failed to give relief, an abdominal operation with removal of both tubes and the right ovary, ventro-suspension being done because of retroflexion. The tubes were the size of the thumb, adherent and twisted; the ovaries atrophic and cystic; the uterus slightly enlarged. The hospital record states that she left on December 2d, 1908, improved. While in the hospital she received regularly at night trional, codein, morphine or other sedative to the time of her discharge.

Mrs. K. came to me December 5th and stated that the sciatica had not been relieved but was as bad as at any time since its onset and that in addition she had since the operation had a backache. She is of large frame, at this time weighed 168 pounds, and had the appearance of good general health. The pulse was seventy-two, regular and of low tension, the heart, lungs and urine normal, and the bowels regular. The affected leg at the calf was an inch and a half larger than the other and there was an irregular area of induration in the lower popliteal space. In indicating the line of pain and tenderness Mrs. K. accurately mapped out the sciatic nerve from the notch down the thigh and along the line of its branches, the internal popliteal and posterior tibial, to the ankle.

The treatment begun December 5th was as follows:

Dec. 5 and 6. Vibration to lumbar spine, a 50 c. p. incandescent light to posterior thigh till warmth and redness were obtained, then the static wave current by a narrow strip of metal to the thigh from the sciatic notch to the knee for twenty minutes, and finally a few static sparks to the thigh, lumbar region and leg.

Dec. 7. The patient did not appear because of rain.

Dec. 8. Treatment of the back discontinued because pain in the back had ceased. Light and wave current to thigh, sparks to thigh and leg. This was the third treatment.

Dec. 9. Slept comfortably in bed last night for the first time since March. Treatment the same as yesterday.

Dec. 10. Slept well. Treatment repeated.

Dec. 11. All pain and tenderness was now found to be limited to the lower popliteal space, and the application of light and the wave current was henceforth limited to this area with a few sparks to the sciatic in its whole length.

Dec. 12. Slept from ten to six, and the only pain felt in the past twenty-four hours was a twinge between six and eight in the morning. Treatment as yesterday, it being the seventh treatment.

Dec. 14. No treatment yesterday. Has had no pain at all since last treatment.

Treatments were continued daily until December 21st. There was no further pain, sleep was sound and refreshing and the patient was allowed to go home in the West for the holidays. No opiates nor sedatives were allowed from the beginning of treatment, December 5th. The patient slept in bed after the third treatment and had no pain or symptom after the seventh treatment. In the wave current a spark gap of four to eight inches was employed with spark interruptions from five to ten times a second.

I next saw Mrs. K. March 13th, 1909, when she weighed 190 pounds, a gain of twenty-two pounds, was perfectly well, and doing active work.

27 East Eleventh Street.

Discussion.

Dr. William B. Snow of New York. One instructive part of this paper concerns the absurdity of the hospital methods in the treatment of sciatica as conducted to-day. For a case of sciatica to be cured in such a short time, when the lesion can be perfectly localized, is the rule. To lie for so long a time in one of the best hospitals without anything being done but the use of counterirritants and sedatives, in a case absolutely curable by the right method, is evidence of the disposition of the medical profession to ignore these things, and it is due humanity that every effort be exerted by those who do know, to try and make those who do not, know that these results can be uniformly obtained by curing them, thereby re-

flecting upon their reputation, if they will not be otherwise instructed. The lay community can be enlightened by contrast in results in an ethical way, by such successes. The attitude of the medical profession, particularly of the neurologists and surgeons in showing unwillingness to accept or investigate modern electrotherapeutics, is unaccountable, to say the least, and consequently their ignorance is generally profound.

Neuritis is always curable when in accessible parts, and very promptly cured in its early stages, by the method described by Dr. Travell. For a human being to be allowed to suffer for weeks, months and years oftentimes from a condition so easily cured, is one of the sins of the medical profession.

Dr. Herbert F. Pitcher, Haverhill, Mass. I think that in sciatica cases we want to be first certain of our diagnosis, to be sure there is no sacro-iliac trouble, to be sure that there is no flat foot, and no relaxation of the ligaments of the foot, which brings a strain on the sciatic nerve. But where we determine a sciatic neuritis I think we can treat it with the utmost satisfaction. As Dr. Travell has said, we use the high power light with great benefit. I usually begin my treatments, if it is an acute or subacute inflammation, with a mild constant current, repeated every day until the pain has subsided, gradually increasing the strength, with the positive pole over the seat of pain, and then later on, when the pain subsides, I use the static wave current. In what we call the lithemic cases, I use the static wave current and the sparks, also vibratory stimulation to the spinal nerve centers and the sciatic notch.

In the so-called rheumatic and gouty cases the salicylic ions are indicated and give decided relief. Using the constant current of 25 milliamperes. The negative pad is wet with a one per cent. sol. salicylat. soda and placed over the sciatic notch, while the positive pad is applied to the most painful region of the thigh or leg.

Dr. Alfred I. Thayer, Glen Falls, N. Y. I would like to express my endorsement of this mode of treatment of sciatic cases, and my indebtedness to Dr. Snow for informing me and teaching me a more thorough and better way of treating those cases. I feel as if I get, as Dr. Snow has stated, almost uniform results. I have treated cases of sciatica for a good many years. I have been interested in electro-therapeutics ever since beginning the practice of medicine and using the galvanic current, but the light and the wave current have given me better results than anything I have used. In some old cases of neuritis with adhesions I give also some stretching of the sciatic nerve. The results I have gotten since studying

with Dr. Snow have been satisfactory and I think I may say uniformly successful in the treatment of sciatic neuritis.

Dr. John W. Torbett, Marlin, Texas. Referring to what Dr. Snow has said, it certainly is a shame that so many of the medical profession do not yet recognize the great power of electricity in treating these things. I have treated several hundred cases of sciatica in the last few years and I know with uniformly good results. I have gotten good results from the continuous current in some cases, the wave current in others and the light in still others. I got started in electricity simply from sciatica.

I went to New York eleven years ago to take a post-graduate course. They said, put the patient to bed, have him stay there three months and keep him quiet. I said that was not right, that I had cured cases more quickly than that. They said there was a crazy man over here by the name of Snow and also a woman who were claiming to cure the condition with electricity. I immediately took a course and began its use with uniformly good results. Some cases will be more benefited I think by the continuous, some by the high frequency, and some by the modality that the Doctor has reported upon. But if you have all the different modalities you will cure all cases except tuberculosis of the spine. When I get a case with involvement of both nerves I suspect tuberculosis of the spine and use the x-ray.

William L. Clark, M.D., of Philadelphia. While the subject of sciatica is under discussion, it might be of interest to you to know how I was cured of a sacroiliac relaxation, and reflex sciatic neuritis, and incidentally came my awakening as to the efficacy of electricity in therapeutics.

About four years ago, after a particularly active winter in general practice, both mentally and physically, in cranking my machine I was taken with a severe pain in the sacroiliac region, which became intensified as the days passed by, and finally I was in such a condition that I could not stand on my feet. The pain radiated from the point of lesion to my heel, the points of greatest intensity being directly over the sacroiliac joint and the sciatic notch. I had in consultation leaders in the profession. They diagnosed the case as "Rheumatic sciatic neuritis," and failed to recognize the relaxation of the joint. Ordinarily anti-rheumatic remedies and diet failed to give me relief, and I continued to suffer torments. I went to Hot Springs, Va., hoping the baths might do good. I there met Dr. Edward Titus, of New York, in a social way, and he suggested the use of electricity. I did not take the suggestion seriously, as I had well formed prejudices against its use. The baths gave me no relief. After my return home the condition became worse and worse. In despair I went to New York and put myself under the care of Dr.

Titus, where I was treated by a technic similar to Dr. Travell's.

I improved, but there was one important factor in the treatment which was neglected, and that was absolute rest and immobility on account of the relaxed joint. Recognizing this, I came home and stayed in bed four and a half months with my pelvis immobilized. Spasm of the gluteal muscles was intense, and it seemed as though nothing would relax them. Static treatment was not available, and I procured a galvanic battery and received daily treatments of light and galvalism. The first treatment brought about relaxation of the gluteal muscles, and from that time I improved very much. Finally I was able to cautiously stand upon my feet, but fearing recurrence I had a special brace made which effectively immobilized my pelvis.

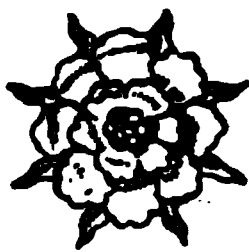
I attribute the cure to electricity, light and immobilization. Since then I have employed these measures in my practice, and have not been disappointed in the results.

Dr. Edward C. Titus of New York. I desire to comment upon Dr. Travell's paper for several reasons. I think his case illustrates very aptly the necessity of relieving the source of irritation before we attempt to cure the condition. I would like to ask Dr. Travell whether he ever considered that factor as one of the causative ones in the case that he had under consideration, whether or not the patient had established a nerve habit or pain habit in the sciatic nerve as the result of immediate or remote reflex irritation from some pelvic or abdominal disturbance? So often following the removal of some of the pelvic adnexa or the relief of some intra-abdominal condition the pain will persist for a long time because of the habit that has been established in the nerve for the manifestation of pain. Very often it is quite essential first to remove a probable cause before we begin to treat the symptom of pain. The treatment is essential for the reason that after the cause has been removed the habit will persist for an indefinite time.

Dr. Travell closing. I will not attempt to make comment on the remarks of those who have discussed my paper previous to Dr. Titus.

His last point is well brought up. It might well be thought by those who knew of this case that possibly the operative treatment received in the hospital really was of some final benefit. However, I fail to find any reason for attributing benefit to that operation. The patient during the remainder of her stay in the hospital was kept under opiates, and left the hospital with as much pain as she had had at any time—persistent pain day after day and night after night. She then was entirely relieved of all pain in a week. There was in the lower popliteal space an irregular indurated area. The

calf of the leg was an inch and a half larger in circumference than the calf of the other leg. The condition had developed suddenly when about to step over a box while carrying a weight. I believe that there was a laceration of the soft tissues in the lower popliteal space with an exudate which produced pressure upon the nerve at that point and was the sole cause of the pain and illness. By treatment applied to that seat of trouble I drove out the exudate and thereby quickly relieved the pain. The treatment at the hospital, especially the operative treatment, was not sufficient to dissipate an exudate in the popliteal space and to relieve pain from that source. After such treatment the pain continued as before, yet was promptly relieved by a different method of treatment. I therefore do not believe this to have been a case of nerve habit or to have been at all relieved by the abdominal operation. I referred this case the week following the week in which she was entirely relieved from pain to the surgeon who had had her under treatment at the New York Hospital. He examined her and was intensely pleased. He said, "Well, I do not care what you call it. You may call it hysteria if you wish, but you have done something that we did not do."



THE TREATMENT OF CHRONIC METRITIS WITH DESCENT OR DISPLACEMENT.*

BY G. BETTON MASSEY, M.D.,

Attending Surgeon, American Oncologic Hospital, Philadelphia.

At the recent meeting of the American Medical Association at St. Louis the Section on Obstetrics and Diseases of Women devoted an entire session to the discussion of operations for the treatment of retroflexion, some five different surgeons who had devised operations for this trouble reading papers on their own operations. These practical papers by able men left the hearers in a rather muddled condition, for, with the characteristic straightforwardness of the group dominating that section, there was no hesitation in mentioning many unfortunate results from these operations, whether devised by themselves or by others. Except for these valuable side lights, the whole session seemed to the writer of this paper to be wasted, for it was evident that an immense amount of scientific ingenuity had been devoted to a therapeutic effort based on an incorrect pathology.

No one present seemed to realize that the patients for whom these operations were devised were suffering from enlarged, catarrhal and "displaced" uteri due to some form of inflammation. It is running what might be called a gross form of physical therapeutics "into the ground" to assume that inflammation in the uterus is only mechanical and due to persistent malposition, while of primarily germ origin elsewhere in the body. Moreover, the remedy itself consisted in the production of an artificial fixation in a normally movable organ, which partakes of the vagary of producing one disease in the effort of curing another.

These women suffer from the malpositions only while still suffering from their cause: a more or less chronic endometritis or metritis, except in the several stages of decensus uteri, the distress continuing in the latter case after the cause (whether tears in the pelvic floor or inflammation) has been removed. If we remove the inflammation or hypertrophy the posterior displacement or flexion will cease to give rise to

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symptoms; the patient is well, in other words, though some of the consequences of the affection, such as atrophy of the uterine wall on one side or other, may persist, that are entirely harmless. It is also possible to get similar relief in actual decensus uteri when electrical treatment is employed to reduce the bulk of the organ and stimulate the muscular supports as well as cure the causative inflammation. In each class of cases the organ is left movable, as nature designed it to be.

The form of electrical treatment that I prefer in all of these cases, provided they are not accompanied by inflammation of the adnexa, is the intrauterine employment of 20 to 60 milliamperes, positive, of the constant current, diffusing copper-mercury ions from the amalgamated electrode for four minutes about twice a week, each application being followed by a strongly-contracting induction current from a coarse wire secondary. If one has an apparatus by which these two currents may be combined during the first four minutes even better results are gained, but in all cases the plain induction, secondary or primary, should be turned on a couple of minutes after the constant current has been turned off and before the electrode is removed.

The electrode, a simple uterine sound of copper, properly insulated with fused sealing wax and with the active two inches freely amalgamated with mercury, is easily devised. These intrauterine applications should be given not oftener than twice a week or every five days, and may be interspersed with vaginal applications, preferably with a copper-mercury ball electrode.

As illustrating this work under difficult conditions I will relate the following case:

Case. A lady of 34, mother of one child of eight years, was referred to me by a physician in a city some 200 miles from Philadelphia after she had obstinately refused to submit to what appeared to be a necessary operation for the repair of a relaxation of the pelvic floor and the second degree of prolapse of the uterus with hypertrophy of the cervix. The introitus was greatly relaxed, the fundus of the uterus low and the enlarged cervix, hypertrophied to a length of some five inches, projected outside the vulva. The patient was stout and her abdominal walls relaxed. The subjective symptoms were those usually present in such cases.

Treatment. She was placed under the method described, with the addition of labile combined currents with a soaped pad to the abdomen for the abdominal relaxation, applied daily. The tears in the cervix were lateral, so that it was easy to direct the copper-mercury electrode against the anterior segment, and with the idea of producing a strong local action at this spot the current was frequently raised to 80 milliamperes for one minute.

The patient remained under treatment from February to May. At the latter date the uterus remained continuously within the vagina, even after considerable exercise, and the subjective symptoms were greatly relieved. As the patient wished to go to her summer home for four months the treatment was intermitted, but as I felt that the prolapse might return during the summer I urged that the perineum be repaired before she left, the case being one in which this operation should be done. She begged off until cooler weather.

In October the patient returned with the uterus still within the vagina, and feeling even better than in May. I reluctantly agreed to cancel my arrangements with the operator and continued the electrical applications at intervals during the following winter. The uterus rose somewhat higher into position, and has since shown no tendency to a recurrence of the prolapse, though the patient indulges frequently in dancing. The improvement in her general health has been marked.

[Note.—This patient was seen and examined recently, three years after the beginning of the treatment. The hypertrophy of the cervix has remained cured by contraction to a normal depth and the whole uterus remains within the vulva, though somewhat lower than normal. The patient considers herself well, yet there can be no question but that her comfort would be increased by a repair of the perineum. In her present condition, nevertheless, she is far more normal in every way than if a suspension had been done.]

Discussion.

Dr. Francis B. Bishop of Washington, D. C. Dr. Massey's papers are always of a most practical character. I would like to ask him why he has changed the zinc-mercury electrode for a copper-mercury electrode. I have been using the zinc-mercury electrodes with excellent results, and I would like to know if there is any special reason to change to the copper. The treat-

ment that I have usually followed, one that I learned from Dr. Massey many years ago, is to place the patient in the Sim's position and use an intra-uterine electrode of mercury and zinc. When using an intra-vaginal electrode (I generally use zinc with a solution of sulphate of zinc surrounding it), and while the progress is slow, it is generally very sure, and I think that many, many of these cases might be saved from operation by the use of this method.

Dr. John W. Torbett of Marlin, Texas. I would like to commend the method of treatment advocated by Dr. Massey, which he has advocated for so many years, and which I have used on a great many cases. There is no doubt that a great many cases can be saved from the surgeon by that method. I have used, however, some form of tampon, usually the vaginal wool capsules, for the purpose of supporting the womb and holding it up in position, in order to permit the ligaments to contract and keep up drainage, generally using the common ichthyol and glycerine. But in cases where there is subinvolution, I have used magnesium sulphate douches also for the past four or five years, and they have a very remarkable effect in depleting the uterus. It depletes any mucous membrane the same as it does the bowels. By using one of those retention irrigators the patient can take the douche on the bed without spoiling anything. The solution at a temperature of 120 can be held in contact with the uterus for several minutes, thus getting the benefit of the heat also. This apparatus is made by Betz and others. By using as much as an ounce of the magnesium sulphate to a large fountain syringe full of water we get the depleting effect and it keeps up the drainage.

Dr. William B. Snow of New York. There is something that has not been said that I want to add. In the first place, I want to say that Dr. Massey has struck the keynote with reference to the idea that there must not be a radical operation upon the uterus of ventro-fixation because the uterus is out of place. His conclusion that the uterus when reduced to normal size will stay in place is one of the things the surgeons have got to learn.

Now, unless a case shows considerable indication of endometritis with severe flooding, indicating an unhealthy endometrium, we have ceased to use any intra-uterine treatment. We have had cases with complete prolapse, with lacerated cervix—stellate lacerations—with the perineal body nearly gone, after seven years of subinvolution, which with the treatment per vaginum with a vacuum electrode from the static machine and with the wave current in the rectum, have in a month been reduced to a normal position, when the woman became pregnant and has borne two children. This was accomplished with the wave current and the direct vacuum tube current.

If a patient comes to me with a subinvolted uterus, wearing a pessary, we remove the pessary at once, when the reduction of the subinvolution is quite prompt with the static current in the rectum when the uterus as a rule assumes its normal position. In dysmenorrhœa, the relief of the congestion of the fundus which causes a spasm of the os is very prompt. It is practically the same treatment as we apply to the prostate gland, taking care that the electrode in the rectum is placed against the uterus. I mention this as another way of accomplishing the same result, and oftentimes to be preferred, especially in the congestions that occur in dysmenorrhœa and retroversions.

Dr. Frederick deKraft of New York. I recall a number of cases that I have treated within the past year with a mild wave current with a metal electrode in the vagina against the uterus, using a spark gap of about two and a half inches, a rather thin spark and slow interruption. I have been surprised at the amount of mucus that would invariably be on the electrode on its withdrawal after twenty minutes' treatment. Invariably the woman would feel much relief. I have had them say they were entirely free from pain and discomfort after one of these treatments. I recall a number of cases where the uterus was very large, and in the course of six or eight treatments it had regained its normal size. I recall a case where a woman had a prolapsed uterus so that it was down to the opening of the vagina. With this mild wave current applied about four years ago the uterus regained its normal position, and has remained there, in spite of the fact that the perineum was never repaired.

Dr. Francis H. Humphris of London, England. Anything which will obviate ventral-fixation of the uterus is most devoutly to be wished. I think it is the most unsatisfactory of all the gynecological operations. I have seen the operation done by one of the most brilliant surgeons in this country, and a year later the uterus was back in the same old place. I remember one woman. I first treated her for constipation. She was operated on by a surgeon in Honolulu. Back the uterus went to its old position. Then they sent her to San Francisco. She was operated on by one of the best surgeons there. The condition again recurred. She came back and was operated on again. Then she was sent to New York and operated on, and a year later the uterus was again back in the same place.

That case to which Dr. Snow referred not only benefited the woman but it benefited me, because it was the most striking effect I had seen in static electricity, and up to that time I had looked upon it with a doubting eye. When Dr. Snow told me about that case I was a little skeptical, and it was only after a long talk with the woman that I really believed it.

Since then I have learned to know that what Dr. Snow says is true. This was many years ago.

It is always a pleasure to hear Dr. Massey read a paper and tell the way he applies things and the medicines which he gives. There are few writers of papers or books whose writings receive the attention in Europe which Dr. Massey's do, because of the way he gives us his amperage and the size of the electrode. Anything that comes from his conservative gynecology is not only received with respect, but also made a note of.

Dr. Herbert F. Pitcher of Haverhill, Mass. I would like to add my testimony to the use of the static wave current in subinvolted conditions of the uterus. In a large uterus that sags down, with relaxed ligaments, you can do a great deal to tone up the ligaments. Although, as Dr. Massey has said in regard to the introduction of the intra-uterine electrode, there are cases of the hemorrhagic variety where there is no other method that will benefit. I dislike to introduce an electrode into the uterus, and the patients do not like to have it done. They had rather the treatment would be prolonged, because in the majority of the cases it causes quite a little distress, and it sometimes relights an old septic condition. But with the copper ball electrode wrapped with cotton, placed against the uterus, with a current of forty to sixty milliamperes or more, you can contract the enlarged hemorrhagic uterus in that way without introducing the electrode into the uterus. But some hemorrhagic cases cannot be helped in any other way.

Dr. Massey in closing. I am gratified at the discussion.

Dr. Humphris asked me privately as I sat down whether I had had any other cases of such elongated cervixes like that, so readily relieved. I recall something like half a dozen such cases. One or two of them are reported in "Conservative Gynecology and Electro-therapeutics." Everyone of them has been relieved. Not only did these two to five inches of cervix recede into position and stay there, but the women were cured of their symptoms. I have a very vivid recollection of several cases in which the symptoms persisted after amputation of the cervix.

Dr. Bishop asked why I mentioned copper ions instead of zinc ions. I have been led to avoid zinc when I did not want much local action. I wanted a linear cauterization in the front half of the segment, and not a very deep one, so as to avoid unpleasant immediate symptoms. This was repeated off and on the whole winter. The copper was better than the zinc when such repeated action is desired. For the same reason I use a copper ball in the vagina when I do not wish local action.

Dr. Torbett speaks of support during treatment. I did that

once, a good many years ago, in a young woman who had a certain number of weeks only to devote to treatment, making quick results necessary. For eight years she had worn a pessary. I thought it safest to continue the pessary for a while. Then I said boldly, "leave it out." The order to leave it out was compiled with, and the result was successful. That is, her return to an active life without the pessary, but with occasional treatment, was not followed by a relapse. A perfect cure resulted. That was not a case of hypertrophy, but simply of prolapse. But since that, even in these enormously hypertrophied cases, I recall supporting but one prolapsed uterus or hypertrophied cervix even during the treatment. That one case was a hospital patient with hypertrophied cervix, and I simply pushed it up and put in a little cotton to hold it in between applications. This was done two or three times only, and the cervix then remained up itself.

Dr. Snow, in commending my remarks on the value of avoiding fixation, reminded me of some of the things I heard at the recent American Medical Association meeting at St. Louis. Some of the operators would tell of their patients who could not take a step downward without holding their abdomens after operation. That was one of the reported results of ventro-suspension. Others die as a result of it, so they say.

Dr. Pitcher decries intra-uterine treatment very properly, but he should remember that, as I have very little general practice, the cases that are sent to me are very bad, and they are anxious to get home. The time available for treatment is limited. The intra-uterine application in skilled hands will hasten results, and it is essential, of course, in the hypertrophies of the cervix.

Dr. Snow has made a just criticism in the matter of vaginal treatment. I feel convinced that in certain less serious conditions than these hypertrophies and persistent prolapses my vaginal and intra-uterine constant current treatment could be well replaced by the wave current. I am, however, also sure that the combined galvanic and faradic are so effectual in contracting relaxed pelvic and abdominal tissues that they cannot be surpassed by anything for these purposes.



RADIUM: WHAT IT IS; WHAT IT HAS ACCOMPLISHED; AND WHERE IT HAS FAILED.

BY WILLIAM H. DIEFFENBACH, M.D., NEW YORK CITY.

Radium was discovered in 1898 by Professor and Madame Curie, of Paris, who, working conjointly along definite lines, announced to the world the isolation of a new element and described some of its properties. A few years previous Professor Henri Becquerel had accidentally discovered that pitch-blend containing uranium had the ability to affect a covered photographic plate, and had noted that this was due to certain rays, which were called Becquerel rays.

In following out a line of research to determine if larger amounts of these rays could be procured, pitch-blend was purified and, when pure uranium salts were obtained, it was found that they affected the photographer's plate less than did the original pitch-blend. It was found that the residue gave off more rays, and the physicists set about to discover the compound or element giving off these additional rays. In quick succession polonium, actinium and, lastly, radium were announced to the world, and at the present time there are more than a dozen radio-active substances known. Aside from radium, thorium, used in the Welsbach mantle, is the best known of these substances.

Radium has an atomic weight of 225, and has during the summer been isolated by Madame Curie, having previous to that been secured only as a compound of bromide, chloride, acetate and sulphate. The pure radium, as described by Madame Curie is a white metal which oxidizes in water, burns paper, turns black on exposure to air, and has the property of adhering firmly to iron.

It is of the compounds that we will speak at this time, the compound in common use being radium bromide. This compound looks like a yellowish powder, and when mixed with barium, its chief impurity, it assumes a grayish color.

Briefly, some of the physical properties of radium are: It gives off heat, rendering bodies surrounding it of higher temperature than normal; it gives off light; its rays are able to penetrate opaque substances; it gives off a gas, or emanation. A number of rays given off from this substance have been

described, chief of which are the alpha, beta and gamma. It also has the property of rendering other substances radioactive if brought in contact with them.

It is stated that radium is found throughout the earth in minute quantities, and that it is the presence of radium in the earth's crust that keeps up the heat of the earth. Radium is found in appreciable deposits in Bohemia, in Cornwall,, England, in Portugal, and in Colorado and California. It is chiefly obtained from the mineral pitch-blend, but is also found in other earths, such as carnotites. It is the radium found about springs which renders the waters of these springs radioactive and which has given these springs therapeutic reputation. The waters of Gastein, Austria, and Kissingen, Germany, are particularly radio-active. The therapeutic results of other springs containing few or no mineral ingredients can only be explained by the fact that the minute amounts of radium contained in the water, or the emanations of the radium contained in the water, produce these results. What the Germans have called "Brunnengeist," or "spirit of the spring," we now know to be the emanations given off from radio-active compounds, and explains why such waters, when bottled, lose their reputed value after a period of time. The rays given off from radium are due to the disintegration of this compound, the splitting up of atoms, liberating electrons, which produce various manifestations. These rays, when penetrating other substances, such as lead, gold, silver and aluminum, again set up other vibrations, the study of which in the near future will again enhance our therapeutic field. We are at present experimenting with gold and silver leaf as a filter for both x-rays and radium rays, and have noted some new effects not produced before. Among the rays emitted is, (1) the alpha ray, comprising about 90 per cent. of the rays given off. These rays carry a positive charge, and upon the skin have but slight penetration, being stopped by a sheet of paper. When radium is preserved in tubes of glass or mica, the alpha rays are cut off entirely. The beta rays, another ray, has deeper penetration, carries a negative charge and is similar to the cathode ray of the Crooke's tube. These beta rays again differ in character, some having deeper penetrating power than others. The gamma ray carries no charge, has deep penetrating power, is able to take radiographs of

opaque substances, and is believed to be identical with the x-ray. It constitutes less than 2 per cent. of the output.

The emanations, or gas, is believed to be helium, and the giving off of this gas lowers the atomic weight of radium, so that radium, through a number of steps, gradually is believed to be changed into the element, lead. This emanation is noted about the sun in large amounts, and it is believed that the heat of the sun is due to enormous amounts of radium contained in that body.

The volume or amount of rays given off from a specimen of radium depends upon its quantity and activity. The unit of radio-activity was based on pure uranium oxide and, depending upon the purity of a radium compound, it was labeled at 10,000; 25,000; 250,000; and lastly, 2,000,000 activity, each strength being relatively more active in rays than the same quantity of uranium oxide. At a recent convention it was proposed to adopt a new standard of activity, taking twenty milligrams of pure radium bromide in a glass tube as a standard, and calling the output in rays after one hour "one curie," in imitation of electrical standards—volt, ampere, etc. Thus, a tube of 200,000 activity of twenty grains of radium gives off in one hour a dosage of one-tenth curie. Radium can be tested by a photographic plate; more rapidly by the electroscope. (Demonstration.)

Radium was originally preserved in glass and aluminum tubes, but realizing that many of its rays were cut off by glass, Mr. Hugo Lieber, in 1902, produced a film, or varnish, made of a solution of radium, and coated this varnish upon pieces of celluloid, bougies and metal disks, for treatment of the skin and orifices of the body. The writer claims the credit of being the first to apply these coatings, or films, at the Clinic of Flower Hospital, in 1902; and at the first International Congress for Radiology, held at Liege, Belgium, in September, 1905, gave a preliminary report of this original work with the Lieber coatings. Since that time (1905) Drs. Wickham and De Grais of Paris have assiduously worked along these lines, and their work has received recognition, not only abroad, but Dr. Wickham was heard before the New York Academy of Medicine last week, in this same building, where his work was pronounced as "epoch making." These same physicians have published a splendid text-book on the

subject of radium therapy, but they did not mention the priority of the speaker and of Flower Hospital in this work.

Besides films, radio-active solutions can be mixed with clay, mud, and poultices, and can also be served in ordinary solutions such as water and gelatine. Willow charcoal absorbs the emanations from radium and holds them for a number of days, so that the rays can be administered by mouth in that way also.

Since 1906 the writer has utilized a mixture of radium gelatine, also devised by Lieber, as a local application of saturated gauze or tampons; and in 1908 the writer, in conjunction with Dr. Helmuth, first essayed the use of radium solutions as an injection. Dr. E. Stillman Bailey, of Chicago, has utilized mixtures of pitch-blend and thorium of very low radio-activity for numerous conditions, and is still working at the therapeutics of these mild preparations.

Having thus rapidly gone over some of the physics of radium, which demonstrates that it possesses a most remarkable array of properties, the study of which has revolutionized some of the principles of chemistry and physics, and promises to explain many things in biology and medicine, we will proceed to the discussion of some of its physiological and medicinal properties. Among the latter the action of potentized or dilute remedies can now readily be explained on the electron theory. The physiological and pathological action of radium upon the tissues was discovered by chance. Professor Curie placed a small tube of radium in his vest pocket and travelled from Paris to London, delivered a lecture there, and carried this tube in the same pocket back to Paris. On his return home, when undressing, he noted that in the same region where the radium had been placed a marked dermatitis had been produced, which caused a great deal of discomfort and itching, and which required a number of months for healing. This accident led him to donate a quantity of this substance to the clinics of Paris, and it is from these clinics that most of the reports of radium therapeutics have emanated. The action of radium on the skin is to produce erythema, dermatitis, with accompanying itching, swelling and redness, and if applied for an excessive period necrosis and ulceration supervene. Paradoxical as it may appear it is used therapeutically for the relief of similar conditions, when applied for short

periods of time. On blood-vessels radium produces in massive dosage an obliterating endarteritis.

On the nervous system, radium, if applied for a short period, has a stimulating effect; if applied for a number of hours, it produces paralysis. The length of time of application, therefore, is one of the most important points for study, for opposite effects are produced by short and long exposure.

The quantity of radium employed also has a bearing on the dosage, for a larger amount of radium will give off a relatively larger number of rays, but not an absolutely larger number of rays; and a larger amount, therefore, will require a shorter exposure.

The action of radium has been tested on seeds, on amoeba, and on animals, and all investigators agree that small doses stimulate, while large doses inhibit cellular activity. The study of radium on human tissues has also been carefully investigated, and it is found that where an overpowering dose is given, within the area treated, the nuclei of cells are destroyed, vacuoles are produced, and following this treatment reparative scar tissue is formed and fibrosis supervenes. It is this principle that we attempt to secure in the treatment of malignant growths; and failures in the treatment of malignant growths with radium can be attributed to the fact that it was impossible to place the tissues under the influence of these overpowering rays and secure Nature's method of healing—the formation of a fibrous tissue. In giving moderate doses of radium, the inflammatory reaction takes place within two to four days, and fibrosis supervenes within two to four weeks. If an overpowering dose is given, a necrosis supervenes and healing of the necrosed areas in many cases requires three or six months for regeneration.

The application in practice of this remarkable agent has been confined largely to lesions of the skin and to lesions which heretofore have not been successfully treated in medicine. Some of the lesions successfully treated are: keloids, naevi, port wine marks, naevus flammeus, angioma, urethral caruncle, epithelioma, lupus vulgaris, papilloma, fibroma, and lastly sarcoma and carcinoma—its use in the latter diseases has been confined almost entirely to inoperable cases, or to cases where operation was not deemed advisable; and in spite of failures in some cases, the results obtained certainly

warrant the adoption of radium therapy in these conditions, until a superior method has been found. Its use in the treatment of recurrent malignant conditions has also been gratifying and has, in the writer's practice, supplanted the use of the x-ray in most cases.

To give a review of all the cases treated in the past eight years would fill a book. We will, therefore, confine ourselves to stating that we have treated a large number of cases of epithelioma, which, when superficial, *always* responds to treatment; when deep, *rarely* responded to the treatment, owing, no doubt, to the lack of dosage. Naevi of all kinds have responded in nearly all cases where the patients would not give up the treatment after a short time. Keloids radium acts specifically upon, changing the red raised growths into a white flat scar. Angiomata of the head and face have also responded in every case thus far treated.

Of urethral caruncle six cases have been treated, several of which were assumed to be possibly malignant by the physicians who referred them, and all of these cases were apparently cured. Three cases of which I have been able to keep a record are well after respectively six, four and three years.

Of inoperable cancer of the breast a number of cases were treated, and we have three cases living after respectively four, three, and two years—the rest of the cases having either died or been lost track of.

Of inoperable epithelioma of the oral cavity, including cancer of the lip and tongue, we have had ten cases, of whom six are living and four are dead.

Of inoperable carcinoma of the neck we have had eight cases, of which two are living and six are dead.

Of inoperable carcinoma of the liver we have had four cases, all of whom are dead, one patient after injection having lived for eight months.

Of inoperable cancer of the spleen we have had three cases, all of whom are dead. Of the stomach, one case, who died. Of the bladder, two cases, who died. Of the rectum, five cases, one of whom lived for four years, one is still living after three years, and one is in extremis at present. These three cases were not operated upon. The other two were operated upon, had recurrences, and died within six months after these recurrences.

Of sarcoma of the thigh we have had two cases, of which one case is living after almost two years; the other one died.

Sarcoma of the groin—one case, sent to us in extremis, was so much restored that we had hoped for a complete recovery. The patient lived for almost two years, although when originally injected with the radium his case was hopeless. This latter is the case which gained much publicity, as it was the first case in which Professor Helmuth and the speaker injected radium directly into the affected tissues after a laparotomy. The patient survived the operation, and after one year but a small growth could be palpated where formerly a growth the size of a child's head was present. The patient attended to his business and visited his physicians at different times, expressing his gratification at his remarkable improvement. After eighteen months a recurrence took place in the prostate gland, and during my absence in California this past summer the patient died of edema of the lungs; no doubt due to metastasis. A post-mortem was performed on this case and the report of Professor Heitzmann on the appearance of the remnant of the original tumor shows that "the round cell sarcoma cells necrosed, and that cicatrization had set in, but had not become complete; so that, while parts of the tumor had become destroyed and necrosed other parts escaped destruction. These latter took on an active growth and again destroyed the cicatricial tissue in part and subsequently produced metastasis."

In addition to the inoperable cases of cancer of the breast, a large number of recurrent cases have been treated with Roentgen ray and radium tubes and injections. Of these our records show a percentage of cure of one in three; the sooner these cases are received after recurrence the better the prognosis. In primary, operable cases, three cases have been treated. In all these cases the patients had refused operation and they are alive after three, two and one and a half years respectively. In uterine cancer—inoperable and recurrent—our experience has been quite extensive. The final results in nearly all cases were negative. Several recurrent carcinomata involving the vaginal tissues were kept alive for two years; one case of recurrent carcinoma is still alive after five years and performs her duty as a professional nurse.

It will be noted, therefore, that the use of radium in ma-

lignant conditions involving large areas leaves much to be desired; but judging from the excellent results in small areas we are justified in the attempts made in inoperable cases to produce on a large scale what has many times been produced in small lesions.

The injection method with diffusion of radium throughout the affected tissues offers hope for success and it remains for us to determine the dosage and the repetition of the dose in order to secure fibrosis in the tissues we desire to render inert or destroy.

With the limited amount of radium at our disposal this matter is a difficult one; it is to be hoped that institutions for medical research can be induced to take up this work and carry it on to definite conclusions. The following deductions can be drawn from the work done with this agent during the past eight years:

I. Radium in sufficient dosage is a specific in small aberrant growths, including warts, moles, keloid, leucoplakia, naevi, angiomata, lupus and epithelioma.

II. It cannot cure any of above lesions if the dosage is insufficient or does not penetrate the entire substance of the tumor; hence its failures in cases of deep seated epitheliomata.

III. The combination of surgery and the removal of all involved tissue possible and immediate radium treatment offers hope for success in many cases otherwise considered inoperable.

IV. Injections of radium or introduction of radium tubes or rods into large inoperable tumors have been successful in but a few cases of sarcoma and carcinoma thus far. If the technic of dosage, repetition of same and activity of radium to be employed is further developed there is reason to hope for increased success in this class of cases, for the same principle of cure secured in small lesions should theoretically be applicable to larger ones.

GYNECOLOGY AND ELECTRO-CHEMICAL SURGERY.

BY G. BETTON MASSEY, M.D.

*Epithelioma of the Vulva and Recurrent Growth of the Meatus Urinarius Treated by Ionic Surgery and Plastic Operations.** G. Betton Massey, M.D. Philadelphia (*Jour. A. M. A.*, March 25, 1911).

"The case of epithelioma of the vulva is reported as presenting somewhat unusual features, and also as illustrating one type of malignant growth for which the ionic method of destructive sterilization is peculiarly adapted. The permanence of the result attained is fairly assured by the fact that nearly two and a half years have passed since the operation was performed. The salient points of this case were as follows:

"*Patient.*—Miss — —, aged 49, was referred to me by Dr. Marie Formad, of Philadelphia, June 16, 1908.

"*History.*—Four years ago a lump the size of a pea appeared on the right labium majus; it increased in area and ulcerated. Two years ago, Dr. Formad sent her to a hospital where a microscopic examination was made and the case pronounced inoperable. During the past two years the increase in the area of the growth has been rapid.

"*Examination.*—The condition on admission to the Oncologic Hospital was as follows: An eroded and proliferated surface extended from the clitoris to a point below the anus, involving the whole vulvar area and extending some distance into the urethra, vagina and rectum. (Fig. 1.) There was a characteristic discharge accompanied by a foul odor. No enlarged glands were discoverable. The blood-examination showed erythrocytes, 5,550,000; leukocytes, 5,800, and hemoglobin, 81 per cent.

"*Treatment.*—On June 24, 1908, the patient was placed under ether and a major monopolar application of zinc-mercury ions was made with a current of from 1,000 to 1,200 milliamperes for one hour. This application was accomplished by the ionic dissolution of sixteen zinc needles, each heavily coated with quicksilver and inserted in the periphery of the

*Read before the Obstetrical Society of Philadelphia, Dec. 1, 1910.

growth. The needles were connected with the positive pole of the direct current, the negative being a large kaolin pad under the patient's back. On separation of the large mass of sterilized tissue two weeks later an immense cloaca-like opening was revealed, into which the three pelvic outlets coalesced, the cavity extending so far on the right as to expose the lower edge of the pubic ramus. The wound was painless, and filled

FIG. 1. EPITHELIOMA OF VULVA BEFORE IONIC OPERATION.

in rapidly. By August 18 the patient had regained partial control of both rectum and bladder.

"Subsequent History.—Four months after the operation the floor of the pelvis had become partially replaced by healthy scar tissue, though this tissue was insufficient to prevent a protrusion of the vaginal and rectal walls, the prolapsed anterior vaginal wall containing a cystocele and giving marked discomfort when the patient sneezed or laughed. Dr. Longenecker, of the hospital staff, kindly did a plastic opera-

tion at this time on the anterior vaginal wall, with excellent results.

"Plastic Operation.—Ten months after the ionic operation the cicatrization was still incomplete at a central point around the urethral opening, this opening existing at about the middle point of the normal urethral length, the external portion having been involved in the disease and destroyed at the operation. It was decided that a plastic operation for covering the bare area would be tried, and this was done by Dr. Hewson, April 18, 1909, a square flap of skin and subdermic tissue being dissected from the left side of the scar and side of the thigh and transferred to the freshened surface, an opening having been made in the middle of the flap to correspond with the urethra. A soft catheter was placed securely in the partly artificial urethra thus made and kept in position for six days, leaving some vesical irritation.

"Result.—At the present time [three years] since the ionic operation, there is no evidence of recurrence of the malignant growth, and the patient's only discomfort is due to the practical absence of the lower rectal sphincter, making it difficult to retain flatus, and permitting soiling of the clothing when the feces are unformed. The bladder retains some of the sensitiveness acquired at the time of the last plastic operation, and micturition is somewhat precipitant. (Fig. 2.)

"Examination of Growth.—A specimen of the tissue was removed just prior to the ionic operation and was reported on as follows by Dr. John M. Swan, the pathologist of the hospital:

"'A piece of tissue from the vulva, submitted for examination: The specimen is composed of skin and subcutaneous tissue. The epidermis has grown down into the underlying connective tissues, where it forms irregular islands of epithelial cells surrounded by young connective tissue. The cells in the epithelial islands are squamous in type. There are no pearly bodies. Diagnosis: squamous-celled epithelioma of vulva.'"

RECURRENT GROWTH OF MEATUS.

"The other case to which I invite attention is an illustration of the difficulties that sometimes surround the diagnosis of growths of the urethral orifice in women. The appearance presented by this growth when first seen was that of a typical caruncle, the bright red color of the round protuberance showing within the urethral orifice, and its exquisite tenderness,

both indicating a benign neoplasm. Yet a measure of destructive sterilization adapted to such a diagnosis was followed by the recurrence of a distinctly malignant growth in

FIG. 2. OPERATION OF SCAR OF EPITHELIOMA OF VULVA THREE YEARS AFTER IONIC OPERATION. THE LARGE OPENING IS THE RECTUM AND THE SMALL SPOT ABOVE THE MEATUS.

the same situation a few months later. The successful destruction of this second manifestation of the growth by an ionic application fully adapted to the malignant conditions will illustrate also, I think, the value of this form of surgery

in this situation, and the opportunity that it presents for conserving the unaffected urethral tissues.

"Patient.—Miss —, aged 33, was referred to me by Dr. J. B. Shaw, of Trenton, N. J., May 12, 1909. Her father died of cancer of the liver, otherwise the family history was negative. During the past five years the patient had lost 35 pounds in weight, and for two years she had suffered from a burning sensation at the urethral opening, greatly aggravated by the passage of urine, and from a more constant soreness

FIG. 3. CARUNCLE OF MEATUS URINARIUS, IN APPARENTLY BENIGN STAGE.

referred to the bladder, with considerable muco-purulent leukorrhea.

"Examination.—The patient was rather thin and somewhat bronzed in color. Inspection revealed a bright red caruncle-like body the size of a pea projecting slightly from the meatus urinarius. (Fig. 3.) It was smooth and excessively tender to the touch. On urethroscopic examination the caruncle could be traced as an elongation up the urethra about one inch, it being attached as a sessile growth to the right side of the urethral mucous membrane.

"Treatment.—The patient was admitted to the Oncologic Hospital and placed under ether for ionic destruction of the growth May 13, 1909. After etherization, a specimen was removed for microscopic examination; this caused free hemorrhage, which was quickly arrested by placing a zinc-mercury

needle in the wound and turning on from 30 to 40 milliamperes of the direct current, positive. The hemorrhage being controlled, another positive zinc-mercury needle was thrust into the base of the growth, and, with both needles active, the current was raised to 80 milliamperes and maintained at this strength until the whole of the growth appeared to be devitalized and white, the total duration of the application being sixteen minutes.

"Result.—The patient required catheterizing for twenty-four hours, after which time urine was voided. There was no rise of temperature. The small slough separated one week

FIG. 4. CARUNCLE OF MEATUS WOUND SEVEN MONTHS AFTER FIRST APPLICATION. INSTEAD OF HEALING IT WAS BEGINNING TO GROW LARGER, WITH RAISED, HARD EDGES.

later, and the patient was discharged from the hospital at the end of two weeks.

"Examination of Growth.—The specimens removed were submitted to Dr. Swan, who made the following uncertain report, the cause of the uncertainty possibly being the failure to secure a portion of the base of the growth.

"Pathologic Report on First Specimen.—'A few fragments of tissue removed from the external urinary meatus. The tissue is composed of a surface epithelium of the stratified squamous type lying on a connective tissue ground work. The majority of the sections are of such a nature that no opinion can be given as to their character, but in one slide the connective tissue portion of the specimen is composed of a loose reticulum of cells of varying type mixed with an extensive

exudate of red blood-corpuscles. Many of the cells, I believe, are epithelial cells, and I think the tumor is malignant, but I am not prepared to give an opinion as to its proper classification. Diagnosis: questionable.'"

"Subsequent History.—The patient was kept under close observation, and seven months later (Dec. 13, 1909), there was distinct evidence of a recurrence of the growth in the shape of an ulceration at its site with raised, hard edges that refused to heal. (Fig. 4.) She was readmitted to the hospital under the belief that the growth was originally and still malignant, with a view to its thorough destruction, on this

FIG. 5. PRESENT CONDITION OF SCAR OF GROWTH OF MEATUS. SMOOTH MUCOUS MEMBRANE SHOWS AT SITE OF SCAR, THE IRREGULAR NODULE BEING DISPLACED BY HEALTHY VAGINAL RUGAE.

occasion a current of 200 to 300 milliamperes was employed for double the previous time, or thirty-four minutes, and with six larger needles completely circling the growth at its base. Both operations were monopolar, that is, the negative pole was a large kaolin pad beneath the patient's back. Special efforts were made at this second operation to reach the highest point of the growth in the urethra with as little loss of muscular tissue as possible.

"Pathologic Report on Second Specimen.—The pathologic report on the specimen removed at this time as follows:

"Three fragments of tissue removed near the orifice of the urethra, submitted for examination. The largest of these fragments is composed of very much hypertrophied squamous epithelium, which is in one place thrown into numerous folds so that it resembles the duct of a gland. Many of the cells of this epithelium are hydropic. No place can be found in which this epithelium extends into the underlying connective tissue, but the connective tissue just beneath it is the seat of a very well-marked round-celled infiltration, and these cells are principally of the plasma-cell type. The tissue is markedly congested, and in some places there is free hemorrhage. The round-celled infiltration above referred to is seen in scattered areas throughout the connective tissues, here and there associated with polymorpho-nuclear cells. There are a great many new blood-vessels in the tissue. One of the smaller bits is elliptical in outline, surrounded throughout its entire extent with a stratified squamous epithelium which does not dip down into the underlying connective tissue. This connective tissue is rich in blood-vessels, which are filled with blood, and shows numerous fibroblasts, and areas of small round-celled infiltration of the plasma-cell type, mixed with lymphocytes. The third piece is composed of masses of round cells of varying type; polymorphonuclears, lymphocytes, plasma cells and fragmented nuclei. The tissue contains numerous blood-vessels with fairly thick walls. In several places there is free hemorrhage. In one part of this piece the endothelial cells forming the walls of the blood-vessels appear to be proliferating. Diagnosis: infective granuloma (?)."*

"Third Operation.—On Feb. 24, 1910, the patient was admitted a third time for the destruction of three nodules of bright color at the meatus. A current of from 100 to 150 milliamperes was used for twelve minutes, with three needles.

"Result.—Her progress thereafter was steady, the parts closing in with tissue of normal color, somewhat retracted, but with complete control of the bladder and absence of unpleasant sensations. At present [one year and three months], after the last operation there is smooth scar tissue occupying the whole site of the growth, the external layer being regenerated skin and mucous membrane by peripheral budding. The urethra seems healthy and of normal caliber, with the meatus retracted about one inch. This retraction has tilted the anterior wall of the vagina outward at the urethral orifice. (Fig. 5.) The patient's unpleasant sensations on micturition have ceased and she has good control over the bladder. No evidence of a return of the disease can be found, and she has gained in weight and color."

*Dr. Joseph McFarland has also examined the slides recently and concurs in the substance of this opinion.

Progress in Physical Therapeutics.

RADIOGRAPHY.

EDITED BY FREDERICK M. LAW, M.D.

Therapeutics. Journal American Medical Association, Vol. 61, page 195. "Post-Operative Roentgenization of Cancer."

This ably written editorial on the above subject deserves more than a passing notice. It is not often we have seen editorials in this organ taking the stand on the subject as unequivocally as this article. It is handled in a masterly and scientific manner and will accomplish much good in the opinion of the reviewer as its wide circulation will reach the men our special journals do not.

He commences with the assertion of the fact that the x-ray when skillfully applied has demonstrated valuable curative properties, which only the most obtuse deny to-day. Every radiotherapist who has attained sufficient knowledge and had sufficient experience to entitle him to the designation, endorses the above statement and recommends that the x-ray be applied *as a routine measure*, without waiting for a recurrence to take place, in conjunction with every operation for cancer.

There is found some difference of opinion as to whether raying should be done before the operation or whether it should be done before and after both, but there is no divided opinion as to its importance after an operation for the removal of cancer.

The doubters, he points out, are not those who know the agent in all its aspects, and who have seen the cures effected, but the surgeons whose personal experience is not sufficient to make them familiar with the x-ray skillfully applied in post-operative cases. "When the average surgeon is told that every patient should be Roentgenized immediately after operation for cancer, as a routine measure, just as soon as the operation wound has healed, he assumes one of three attitudes: (1) frank scepticism as to the utility of Roentgenization in any but superficial cancerous lesions, an attitude usually provoked by the failures that have come under their observation, discouraging them from seeking further enlightenment from competent sources or from investigating the causes of these failures; (2) agnosticism, accompanied by indifference are sometimes due to abstraction in a large practice, sufficient to prevent him from taking the trouble to look up the therapeutic result of some good Roentgenologist; or (3) a challenge to discussion opened by such queries as (1) "Why

should a patient be Roentgenized before cancer has manifested itself?" (2) "Why should every patient be subjected to the extra expense involved in the routine post-operative Roentgenization, when we know many will be radically cured by extirpation alone, and that recurrence will not take place in such cases?" (3) "Why Roentgenize many patients unnecessarily?"

He thinks all converts must come from the last class of surgeons. He considers that the Roentgenologist should have the last word instead of the surgeon as to whether the x-ray should be used or not in any case of cancer removal. "The reason why Roentgenization should not be delayed until recurrence has taken place is that by the time recurrence has manifested itself the malignant process will in many cases have progressed so far that neither the x-ray nor anything else can reach it effectively. The most dangerous recurrences occur internally; they frequently take place with terrifying promptness, and without giving any outward or visible sign of their presence until they are well developed. Again, it is a well established fact that recurrences are frequently far more vicious and resistant to the x-ray than the original lesion. It is also a well established fact that the x-ray is powerless to arrest many recurrences. Why then subject any patient to the gloomy chance of developing such a recurrence, when the catastrophe could be so easily forestalled in at least many cases by immediate post-operative treatment."

Concerning the wisdom of advising the patient to incur the extra expense for a remedy that may not be essential, the same logic applies as in the case of the original operation. The x-ray has demonstrated that it can prevent recurrences in some cases, and the operative procedure has done the same. The x-ray has failed in some cases, and so has operation. Therefore if it is justifiable to recommend operative procedure, it is equally justifiable to recommend post-operative radiation. "The procedure should be applied in every case, though many cases be treated unnecessarily. As a matter of logic, the argument favors the routine post-operative use of the rays more than it does the routine adoption of extirpation because unnecessary or unsuccessful radiation does the patient no harm; if skillfully applied, whereas the unsuccessful extirpation is apt to increase the malignancy of the growth, making the latter condition worse than the first." He thinks that in many of the hopeless cases a combination of extirpation and raying will be effective where neither one alone could hope for anything but failure.

He calls attention to the fact that a good radiographer is not necessarily a good radiotherapist, that while there are probably 2,000 competent radiographers in the United States there are less than 40 skilled scientific radiotherapists.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

Practical Hydrotherapy. By M. E. Eastman (*The California Eclectic Medical Journal*, March, 1911).

After calling attention to the well-known fact that hydrotherapy has not had its dues along scientific lines until recently, the author calls attention to the fact that there are a number of simple and effective methods of using this excellent form of treatment.

Cold Mitten Friction.—Opportunity for employing this form of water treatment will probably be more frequent than any other and is a term to define the process of applying cold water to the entire surface of the body with a mitten on each hand dipped in cold water.

In giving this treatment one should provide themselves with two mittens without thumb places, made from coarse Turkish towelling; two large dry Turkish towels; and a basin of cold or ice water. The patient may remain in bed or recline upon a couch or cot.

The method of administering the treatment is for the attendant to bare one arm; protect the bed coverings with the dry towels; put on the mittens and after dipping the palms in cold water which should be conveniently placed near the bedside, begin at the shoulder and with upward and downward strokes quickly and vigorously rub the surface of the arm until it has a pinkish glow; remove the mittens and thoroughly dry the arm with the Turkish towels. Cover this part and pass to the opposite arm and treat similarly; then to the thorax, lower extremities and last the back. Remember to keep the patient's body covered except the portion being treated.

The length of time required in giving a friction is ordinarily about five or six minutes, and any person of intelligence can be instructed in a few lessons how to give it correctly.

Therapeutically it lowers the bodily temperature; increases the consumption of oxygen; the circulating blood is hurried on its travel; the peripheral nerves are stimulated and through them the entire organism is affected; metabolism is increased and in a general way exerts a powerful toning effect by increasing nutrition.

The cold mitten friction may be used advantageously in all fevers, in chlorosis, anemias, wasting diseases, and similar ailments and in convalescents.

In fevers it may be employed every hour or two as needed and will not only help in combating the temperature rise but also give to your patient added strength and powers of resistance with which to ward off a fatal termination of the disease.

As a general tonic measure once or twice a day is as often as the treatment should be given.

The degree of coolness should be graduated from cool to ice cold according to the strength of the patient.

Alternating Hot and Cold Foot Bath.—Cold feet is one of the very frequent complaints of the opposite sex, and occasionally found in men, and which is overcome with the least difficulty and to the satisfaction of the patient and physician by using the hot and cold foot bath twice daily, morning and evening.

The requisites for employing this treatment are two vessels of sufficient depth that when the feet are placed in and water poured upon them that the water will cover the ankles. A time piece and dry towels.

One vessel should hold cold water and the other one water as hot as can be borne by the patient's feet. Additional hot water should be added during the treatment to maintain a temperature of from 104 to 120 degrees.

Have the patient place the feet in the hot water and keep them there for five minutes. Remove them immediately to the vessel of cold water and hold them in it while slowly counting ten; then place in the hot water now for three minutes, then again in the cold water and hold them in it while slowly counting ten. Repeat this procedure for twenty minutes to half an hour morning and evening and in due course of time the continually cold feet will have given way to warm ones.

This simple treatment may also be employed to advantage in some cases of insomnia, headache, increased flow of blood to the brain, chilblains and sweating of the feet.

The Bed Bath. Wilcox, in his "Manual of Fever Nursing," states that the method here suggested is much less severe than the tub bath, and is valuable when the tub bath is not available.

The bath is given upon a bed upon which has been placed, under the patient and over the pillows, a large rubber sheet reaching almost to the floor at the foot of the bed. This is covered with a muslin or cotton draw sheet. Blankets rolled lengthwise are placed under the rubber blanket at each side, close to the patient, meeting at the feet. The pillows from the upper end of the trough. Several pails of water are poured into this trough and kept cooled to the proper temperature. When the bath has been given, the water is drawn off by raising the head of the bed, separating the rolls of blanket at the foot of the bed and allowing the water to run into the pail at the foot of the bed. A dry sheet is thrown over the patient and the rolls of blankets are removed. This bath is especially applicable in typhoid fever. The best temperatures are 100 degrees F. for a period of three or four minutes to

start with, then gradually reduced at the rate of half a degree a minute until the patient begins to shiver. The cooling should be accompanied by friction to the entire surface of the body.

The editor of this department in his work upon Hydrotherapy calls attention to the use of a somewhat similar bath known as the Coile Bed Bath. This bath is a very valuable one and is much less likely of leaking or giving trouble than the one suggested by Wilcox. In his suggestion that the patient be allowed to shiver, we believe Wilson is in error. No one who has employed hydrotherapy but what learn that the aim and object of the friction is to overcome this, prevent heat formation and retain the blood in the peripheral circulation until cooled by the water. Shivering is an endeavor on the part of nature to compensate for heat loss. It must be borne in mind that the temperature reducing power of baths is only one among many of the very beneficial effects of baths. The rousing effect upon the nervous system is undoubtedly the most important. [C. P.]

Dangers of Hydrotherapeutic Procedures for Infants. By Hansen (*Therapeutische Monatshefte*, Berlin, March 25, 1911).

The writer states that he has had to treat with hydrotherapeutic procedures a large number of infants and that he has had an experience with three cases in which the use of the ordinary brief, warm tub bath or even the mustard pack was followed by most threatening collapse on the part of the infants. These little children were from six to eight months old, suffering with severe catarrh enteritis capillary bronchitis with eczema of the face or in infants convalescing from anemia, following long overfeeding with cow's milk. He expresses the opinion that children of this age brought to the hospital or attended by the physician should not be given a bath at all by the nurses before the infant has been inspected and carefully examined by the physician and then only such bath as is prescribed. If the infant should collapse under any hydrotherapeutic measure Hansen advises the immediate and repeated injections of camphorated oil with warm bottles and inhalations of oxygen. He says that it is possible that such accidents from hydrotherapeutic measures are more common in children with the exudative diathesis, or rather, with the neuropathic tendency, which generally accompanies it. Czerny has reported sudden fatalities under the first cold pack in neuropathic children. Hansen believes that it is wise to refrain from hydrotherapeutic measures altogether with chil-

dren of this exudative diathesis, plus a neuropathic tendency and especially from mustard packs which in other cases may prove so useful.

MECHANICAL VIBRATION-THERAPY.

EDITED BY FREDERICK H. MORSE, M.D.

Occupation Neuritis—Piano Player's Cramp. By Harlan P. Cole, M.D.

Report of some cases showing the successful results obtained by the use of Mechanical Vibratory stimulation based upon his conceptions of the etiology of the affections.

Case Y., a young woman who complained of pain and cramps in both arms, about the same nature and amount at the same time. It was found upon verbal examination that the muscles which have their upper attachment at the back and sides of the cervico-dorsal vertebra, had been strained by the long and continuous use at the piano; with sudden movements back and forth, resulting in a congestion at the point of attachment at the vertebra. This caused an effusion of plastic lymph between the many fibers into which these muscles divide and which are spread over the sides of the vertebrae around the openings through which the spinal nerves have their exit, and from which are given off the nerves forming the brachial plexus. When we consider that this violent exercise is often continued six or eight hours a day we can readily appreciate the amount of traumatism that would result.

"The same would apply to dressmakers and typewriters whose arms are seldom rested, but are continually suspended from these muscles and who complain much of pain at the back of the neck.

"But the difficulty does not end here, for other parts of the spine may become affected by reflexion or extension from the point of the beginning.

"Much has been said of fatigue poisons or the accumulation of effete or broken-down tissue in over-used muscles, which material is not properly or completely removed by the circulation, but I am confident that a good deal of the trouble is due to pressure of the accumulated plastic lymph against the nerves around which it is deposited.

"Case 2.—Mrs. D., a singer and vocal teacher who does much practicing for herself and for her pupils, complained of numbness of the hand and arm, and an inability to recognize the presence of any light material in the hand, as in holding up her dress, although she apparently had the normal power. In this case there were no cramps up to this time. That seems to be a later stage of the condition.

"Case 3.—Mr. B. had devoted himself to almost continual study and practice to fit himself for a concert pianist. About the time he was ready to appear he discovered that he was beginning to have cramps in the muscles of the forearm. These cramps gradually increased until he was compelled to give up all work. As his father was a physician everything to be thought of was done, and he was taken to everyone who was likely to have a valuable opinion on the subject, until after three or four years, it was decided that rest was the only remedy, if remedy it would be.

"About ten years after the beginning of his difficulty I met him through a friend who was his pupil, and who told me of his trouble. I told my friend of case 1—and she was anxious to have me see him, but he absolutely refused to do anything about it as everything had failed; he had given up all idea of ever playing a concert piece and was devoting his efforts to teaching. But she persisted and he finally began treatment with me under protest.

"The treatment in all these cases has been the same, the use of the vibrator to the vertebral attachments of the muscles on either side of the line of the spinous processes of the cervico-dorsal vertebræ. I am always asked what vibrator was used, and I have always answered the Harvard, but I am sure that any machine that has power enough to vibrate the whole depth of the erector spinæ muscle will do equally well, although I prefer a rotary rather than a hammer stroke. The principle point is the movement of one muscle upon another, and the whole mass upon the spaces over the laminae of the vertebræ. The machine does not do the work, but is only the means in the hands of the operator who uses it either intelligently or otherwise, and succeeds or fails accordingly.

"I have often been told by patients that they had used vibration without benefit, when, I am sure the failure was due to an error in diagnosis or to leaving the work to be done by someone who had no definite idea of the details to be worked out. Most physicians think it beneath their dignity, and they have not the time to work out an inflammatory product, when they would devote half a day to dissecting out a fatty tumor that would do less harm. Either they must definitely educate their assistants, or do the work themselves, if they would succeed.

"The use of the vibrator has been too lightly and indefinitely considered. The thing to be accomplished is the movement of one muscle upon another, the breaking up and softening of the deposit so that it can be taken up and carried off by the circulation.

"Superficial vibration or massage is of little benefit in any pathological condition, the whole depth of the region involved must be included in the treatment. But the treatment must not be too severe nor too long continued, else injury and addi-

tional trouble will result through traumatism, or fatigue of the muscles included in the treatment.

"The frequency of the treatments depends on the duration of the disease. Recent cases are liable to be sensitive and must be carefully treated, and those of longer standing frequently become sensitive as they improve. The first treatment in many cases leaves a soreness behind that will be relieved in two or three days by another treatment carefully given.

"Case 1 began playing fuges within six months, and in eighteen months wrote me that she was well.

"Case 2 was relieved of her numbness in a few treatments.

"Case 3 stopped treatment reluctantly at the end of this season and is anxious for the return of the time when he can continue. He assisted his pupils in two recitals, playing a long duet at one, and a solo at the other—not a real test, but more than he had done for a long time.

"In each of these cases the patient was sensitive to the first treatment and there followed a period of tenderness to touch, and a lameness which gradually subsided with each succeeding treatment.

"I estimate the amount of effusion by the amount of tenderness, although two factors have to be considered, first, the great difference in temperament that causes some to be more sensitive than others in the same condition; and second, the duration of the disease. The longer it has existed, and the greater the accumulation, the greater the pressure; and the patient or this part of him will often have passed through the stage of sensitiveness into that of numbness, and these cases will often return by the same road through which they drifted into their difficulty, and become sensitive after a time when a part of the deposit has been removed and the nerves are relieved of some of the pressure.

"The progress will be materially assisted by the application of heat. The Leucodescent lamp comes in here as a valuable aid, one to which we can change when it may seem advisable to stop the use of the vibrator for a time, or to finish the case by aiding the circulation in its effort to remove the deposit after it has been thoroughly broken up by the vibrator."

Clinics on Spondylotherapy.

Dr. Albert Abrams announces a series of five clinics on the principles of Spondylotherapy, to be given in San Francisco during five days following the session of the American Medical Association at Los Angeles.

The clinics will be free to members of the Association. In these clinics will be demonstrated Abrams' new and original methods of diagnosis and there will be an exhibition of pa-

tients who have been symptomatically cured of aneurisms (thoracic and abdominal), myocardial affections, pulmonary tuberculosis and other diseases in a period of time almost incredible by simple methods which can be easily executed by any physician.

Spondylotherapy is essentially physiologic therapeutics based on clinical physiology, *i.e.*, the study of *human physiology* by clinical observations. Progressive medicine is not wholly an achievement of the laboratory and the undersigned will demonstrate how the functional centers of the spinal cord may be stimulated or inhibited in the human subject with the same certainty as is done by the vivisectional experimentalist.

Insomuch as the space for the clinics is limited only those members will be admitted who have applied for cards of admission.

In writing, please to mention the time of arrival in San Francisco, and the duration of sojourn so that, the time and duration of the clinics may be arranged to conform to the wishes of the majority of the applicants. Address DR. ALBERT ABRAMS, 246 Powell St., San Francisco, Cal.

BOOK REVIEWS.

A WORKING MANUAL OF HIGH FREQUENCY CURRENTS. By Noble M. Eberhart, A.M., M.S., M.D., Professor and Head of the Department of Electrotherapy, Chicago College of Medicine and Surgery; Professor of Radiotherapy, High Frequency and Vibration, Illinois School of Electrotherapeutics; Radiotherapist, Francis Willard Hospital; Formerly Attending Physician, Cook County Hospital; Formerly Professor of Electrophysics, Post-Graduate Medical School, Chicago; Member Chicago and Illinois State Medical Societies; American Medical Association; Victoria Institute of Philosophical Society of Great Britain, etc.; Fellow American Electrotherapeutic Association; Author of "Practical x-ray Therapy," "Brief Guide to Vibratory Technique," etc.; Associate Editor, *American Journal of Physiologic Therapeutics*; Electrotherapeutic Editor *Therapeutic Medicine and the Medical Brief*. Chicago, New Medicine Publishing Co. Cloth, \$2.

This little volume is devoted to the subject of high frequency currents. The author has treated the subject in chapters devoted to Explanations of the Character of the Current; Methods of Development; Types of Apparatus and Vacuum Tubes; Physiological Actions and Effects of the Current; General Technique and Special Technique for Local Treatment. In one chapter is given an alphabetical arrangement of diseases with special technique; there is also a chapter devoted to Ozone and Its Methods of Administration and Indication. The work is written in good style, and is generally up to date. In a few instances, exceptions may be taken to statements made by the author, notably the following: "Take

a plain vacuum tube and attach to the current; and when it is lighted up, surround it with the thumb and forefinger, and it will be observed that there is no light beyond the point of contact." This is true, for there is no capacity in contact. On the other hand, surround the tube with the whole hand, and it will be observed that an equal dispersion takes place uniformly to every part of any capacity or capacities in contact with the vacuum tube. The misconception of this fact would lead to many inconveniences and inconsistencies in high frequency therapeutics.

The author is to be congratulated for the generally scientific and practical quality of the work. The work is well illustrated, printed on good paper, and well bound.

* * *

RADIUM THERAPY. By Dr. Louis Wickham and Dr. Degrais. Translated from the French by S. Ernest Dore, M.D., with an introduction by Sir Malcolm Morris, K.C.V.O., one of the physicians to King Edward VII. Octavo, Cloth. 300 pp. Funk & Wagnalls Co., New York. \$5.00 net; postpaid, \$5.15.

This work is a translation from the French. In the Introductory Chapter, Dr. Malcolm Morris has paid tribute to the thoroughness of Dr. Wickham's work. The volume treats the subjects in a most thorough manner from every point of view. The history of the production and physics of radium together with the scientific principles of action and explanation of the properties are fully considered. The author's practical experience with the therapeutics of radium, has enabled him to place before the profession an exhaustive statement of a subject which is both scientific and attractive. His therapeutic results are so well illustrated in the Chapters on Therapeutics, that the reader is placed in a position to appreciate the great significance of the subject. The colored plates give remarkable evidence of the efficiency of radium in the treatment of various malignant conditions as well as of angioma, and the simpler skin diseases. The volume is the most modern treatise on radium therapy. It is well bound, printed upon good paper, and profusely illustrated with lithographic and colored plates of the best workmanship. The author and publishers are to be congratulated upon the excellence of this volume, which should be in the hands of every practitioner who wishes to be up to date in all subjects in therapeutics.

* * *

PLASTER OF PARIS AND HOW TO USE IT. By Martin W. Ware, M.D., N. Y., Adjunct Attending Surgeon, Mount Sinai Hospital; Surgeon to the Good Samaritan Dispensary; Instructor of Surgery in the New York Post-Graduate School. Second edition, revised and

enlarged. Surgery Publishing Co., New York. Price, cloth, square form, \$1.25; De Luxe leather, \$2.50.

The second edition of this little volume which so soon followed the preceding edition, is evidence of the popularity and demand for a work of this kind. It covers fully the principles of applying plaster of paris to all sorts of surgical conditions to which it is adapted. It is a very practical and valuable book on an important subject.

NEW APPARATUS.

ELECTRIC HOT AIR DOUCHE.

The electric appliance shown in the cut consists of a strong fan, driven at a high speed by an electric motor contained in a fan shaped hand piece, with a small electric heater fitted into the nozzle-like projection. This heater, similar to an electric

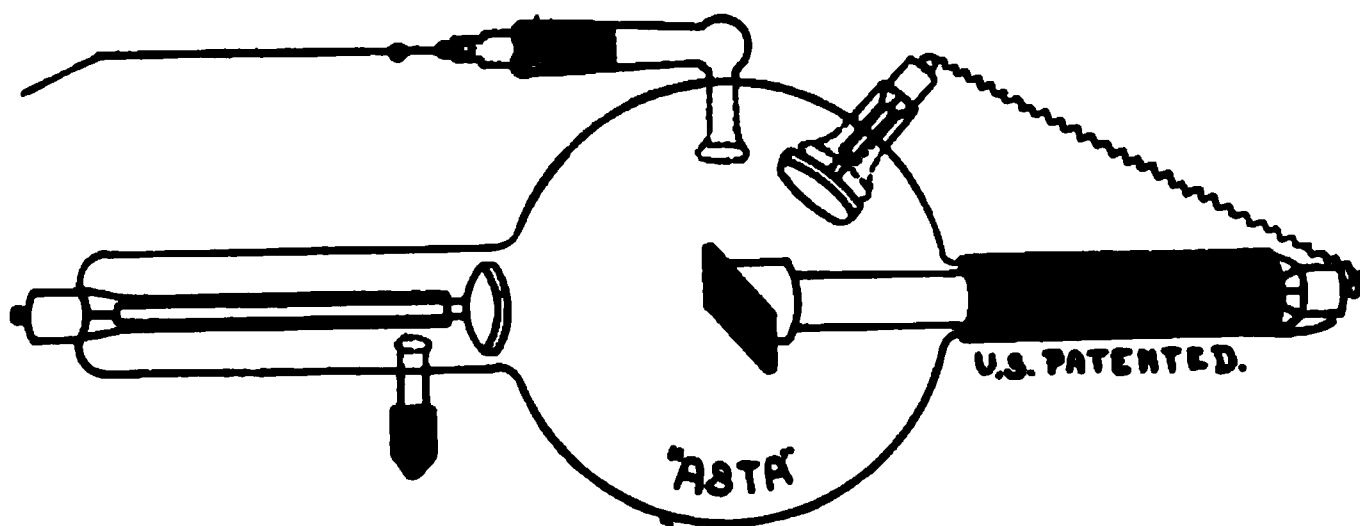
cautery knife, is heated by means of the street current, and the small electric fan, revolving, causes the superheated air to be projected from the nozzle and may be heated to above 100 degrees C. Aside from its medical use for dry heat as indicated, the apparatus has proven extremely convenient in the general household. It can be used for drying ladies' hair, drying plaster bandages, x-ray or other photographic plates, for warming bed clothing, heating bath towels, drying feathers and gloves, and ventilating rooms.

No special wiring is required. The instrument can be held in the hand by means of a counter weight suspended from the ceiling, or a floor stand will place it in position ready for use. A vast amount of heated air is generated by turning on the switch and the temperature is perfectly controlled. It is impossible to burn a patient as the air is absolutely dry. The amount of heat to be applied is regulated by approaching or withdrawing of the douche to or from the body. It is so constructed that alternating hot and cold air may be used by turning on and off the current. The apparatus produces no odor, as the parts are of porcelain and no cloth, wooden boxes or other non-hygienic substances are used in its construction. The current consumption is small, and there is nothing to wear out. Should a heater need renewing, it can be easily replaced at a reasonable cost. The prices vary from \$12.50 to \$35, according to the size and type of apparatus. It is manufactured by the Kny-Scheerer Co., 404-410 West 27th St., New York.

* * *

THE ASTA X-RAY TUBE.

The Asta X-ray Tube, as shown in the accompanying cut, is fitted with a heavy anti-cathode, and also with a patent arrangement for rendering it quite puncture proof.



When the vacuum within the x-ray tube becomes high, there is a tendency to puncture the glass wall of the tube, due to the potential strain to which the glass is subjected. To prevent this occurrence, and greatly add to the life of the tube, a puncture proof device has been invented and patented by the Kny-Scheerer Co. by means of which the current is discharged entirely by sparking device.

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Edited by DR. WILLIAM BENHAM SNOW

Associate Editor DR. ARNOLD SNOW

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RELATION OF HIGH BLOOD PRESSURE TO CARDIAC EXHAUSTION AND INCOMPETENCE.

WHILE recent writers, including Mackenzie, have shown that fibrillation or the separate movements of the muscular fibers of the heart, they not acting in unison, are associated with the calamity known as heart failure; there is still an undoubted relation existing between the increased demand placed upon the heart in conditions associated with hypertension, and arteriosclerosis, which have much to do with bringing about conditions of exhaustion and final collapse.

In youth and health, the heart is capable of meeting the increasing demands associated with physical exertion, valvular incompetency, and arterial resistance. After a long period of time, however, with the coincident associated structural changes, including fibrillation, or other conditions due to impaired nutrition associated with the increased tension or sclerosis of the coronary artery, and a relative diminished nutrition of the structures of the heart, the energies are certain to wane, finally terminating in collapse.

There can be no doubt that with any condition of altered nutrition, overwork, or derangement in the action of the heart muscle; high arterial tension adds an additional obstacle to the preservation of the heart's tone and function. While these different derangements play their parts in impairing the health and hold on life of the individual, probably

nothing that can be done is of greater importance than the regulation of the arterial tension, except possibly the regulation of the nervous mechanism, which may often be impaired functionally from some derangement of the peripheral or central nervous mechanism. It will be found sometimes, that, at the site of the emergence of the posterior roots of the spinal nerves which supply the heart, there are disturbed conditions to which functional derangements can be traced.

The control of hypertension by a systematic regulation of the habits of diet and exercise together with the use of the d'Arsonval current, is so effective and the control of the tendency to hypertension so certain after the condition has been once established, that the profession at large must soon recognize the fact that this condition can be effectually controlled by the systematic employment of the means referred to.

The use of heart tonics or stimulants of the class which includes digitalis, caffeine, and convalaria, in the treatment of an already exhausted heart, struggling to overcome a tension of 200 mm. or more, is a fatal mistake, particularly so when the heart is laboring at the same time against conditions of valvular insufficiency. Under such conditions it can only be a matter of a short time before the heart thus stimulated ceases its labors.

Given a condition of mitral insufficiency, and an arterial tension of upwards of 200 mm., with the blood regurgitating through the left auricle, producing a pulmonary oedema, how happy the result when the existing blood pressure is relieved, and there is complete cessation of the pulmonary symptoms followed promptly by a restoration to health. There is no medicinal treatment that will effect the relief in such a case so promptly as the d'Arsonval current will. D'Arsonvalization will also often relieve an aortic regurgitation, and will always relieve the labors of an overworked heart when it causes a fall of blood pressure.

INFREQUENT REFERENCE TO THE THERAPEUTICS OF RADIANT LIGHT AND HEAT IN MEDICAL JOURNALS.

IT is a matter of regret to those who are familiar with the therapeutic value of radiant light and heat, that so little reference is made to the subject in current medical literature, manifesting the fact that the value of radiant energy in therapeutics is not generally known.

Now that commercial electric lighting circuits are in common use in the home, there is no agent of greater value at the bedside than the modern reflecting 50 c.p. lamps for administering radiant light and heat. The effects of radiant light and heat administered by such lamps provided with a proper parabolic reflector are remarkable in their efficiency when employed intelligently for the treatment of local infection.

Otitis media, either acute or chronic, boils, carbuncles, or other infectious processes are locally relieved by this form of administration. Pain is relieved, and by the induction of active hyperemia, together with the depressing influences of radiant light and heat upon the germs in the tissues, their destruction is effected with the relief of conditions which often tax for months the skill of the physician or surgeon who resorts to other means.

No better demonstration can be made of the efficiency of radiant energy in the treatment of pyogenic processes than the prompt relief of chronic suppurating otitis media after a few half-hour applications of radiant light and heat.

The value of radiant light and heat in its effects upon general and local metabolism, from the lamps of high candle power, and the electric light bath, are among the remarkable advances in modern therapeutics. That a means so easy of administration, and effective, and at the same time so free from objection, should be withheld from the sufferer, and other means less effective employed is an evidence of the disposition of the medical profession through its educators, the colleges and the press, to ignore or fail to discover a truth so pregnant with possibility.

The time cannot be far distant when our hospitals will be provided with these measures, and that the infectious dis-

eases such as typhoid fever and pneumonia, which are so often otherwise unsatisfactorily treated, and allowed to run a course, will be cut short, as they have been already in the practice of advanced workers by the scientific employment of radiant energy.

CARE OF THE STATIC MACHINE DURING THE HEATED SEASON.

IT matters not so much how the static machine which is little used is cared for during periods of humidity; for a machine which is only used occasionally will charge readily on any humid day. But the machine which is in every day use, and more or less constantly, in the office of the man who knows its value, constantly evolves within the case gases which are injurious to the parts, and which tend to lower the efficiency of the apparatus, unless some agent which will act as an absorbent of these gases is employed.

The machine in constant use, therefore, must receive constant attention in order that it may be ever ready for service. No agent has proved so effective, as a means of absorbing both the nitrous oxides and the moisture within the case of the static machine, as the "quick-lime" of commerce. A box for a retainer should be so constructed that it will hold from thirty to sixty pounds of lime, when two-thirds full, the size being regulated to the air space within the machine, or the length of time between intervals of change. This box should be made with slatted sides and open top, and filled two-thirds full of commercial lime, and then covered over with at least two thicknesses of the best quality of unbleached muslin or duck, put on with tacks in such a manner that no dust can escape from the box.

With this provision it is rarely necessary to change the lime in most climates oftener than once in two or three months, during which time a Holtz machine will rarely lose its charge if excited daily. During periods of humidity, however, it is a wise plan for the physician to start his machine briskly for a few minutes before retiring, and again on rising in the morning, in order that there may be no necessity to charge the machine.

If the parts of the machine have become damp externally, with accumulation of moisture and dust upon the pole-pieces, balls, and front of the machine, before attempting to charge

it, the parts should be thoroughly dried off with a chamois or flannel cloth, or what is better subjected to a strong draft from an electric fan for half an hour before charging. When this is done there will be little or no chance of leakage, either from particles of dust or moisture of any part of the exciting current employed for charging the machine. The precautionary steps will often save the operator considerable labor in exciting his discharged static machine.

Operators often make the mistake of placing too thin fabrics, as absorbent gauze or cheese cloth, over the lime box. They will make this mistake, however, but once; for the dust that will fly about the machine and interfere with its working conditions will make them such trouble and expense, that the lesson will be effective.

The importance of these precautions is appreciated by the busy practitioner, who, when having the care of a large number of sufferers, has been deprived of the use of his machine for days on account of an oversight in his preparations for the emergencies of the humid season.

THE TWENTY-FIRST ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

To be held at the College of Physicians of Philadelphia, Philadelphia, Pa., on the 5th, 6th, and 7th of September, 1911.

Preliminary Program.

1. President's Address. The History of the Development of High Potential Currents. Dr. Frederick deKraft, New York.
2. Result of Treatment in a Few Cases of Floating Kidney. Dr. St. John Wright, Akron, O.
3. X-Ray in the Treatment of Cancer of the Breast. Dr. J. N. Scott, Kansas City, Mo.
4. Static Electricity in Nervous and Mental Diseases. Dr. J. J. Kindred, Astoria, N. Y.
5. Experiences of a Pioneer Electrotherapist in Mississippi. Dr. Rosa D. Wiss, Meridian, Miss.
6. The Rational Treatment of Tuberculosis. Dr. Arthur W. Yale, Philadelphia, Pa.
7. Clinical Benefits from the Employment of Electricity in Gastro-Therapeutics: Confirmed Deductions from Over One Thousand Cases. Dr. Anthony Bassler, New York.
8. A Rational Muffler for the Static or High Frequency Spark. Dr. G. E. Pfahler, Philadelphia, Pa.
9. Consultations Regarding X-Ray Dosage: the Physician's Duty to Prescribe X-Ray Earlier in Cancer. Dr. Sinclair Tousey, New York.
10. Roentgen Ray in Therapeutics. Dr. J. D. Gibson, Denver, Colo.
11. Elimination. Dr. Charles O. Files, Portland, Me.
12. The Modern Treatment of Cardio-Vascular Diseases. Dr. William Benham Snow, New York.
13. Some Therapeutical Indications of the High Frequency Currents. Dr. Herbert F. Pitcher, Haverhill, Mass.
14. The Treatment of Constipation. Dr. H. M. Imboden, Clifton Springs, N. Y.

THE X-RAY AND LIGHT IN INFECTIONS, HAY FEVER, AND ENTERIC FEVER.*

BY F. C. TICE, M.D., ROANOKE, VA.

Had Archimedes been seeking a panacea for infectious diseases, and in the course of the search become familiar with the action of the x-ray, light, and the static modalities, he might well have cried "Eureka." A few citations will serve to illustrate the claim.

C. S., aet. 38, male, presented himself on the morning of December 12th, 1909, with acute pulmonary congestion of both lungs, dyspnoea, and sharp lancinating pains throughout the chest. Temperature 102.5, pulse 102, respiration 30, arterial tension 148 mm., congested face and considerable laryngeal irritation. He received a body light treatment, the static wave current to the chest for twenty minutes, and for a chronic rhinitis the high frequency current with insulated low

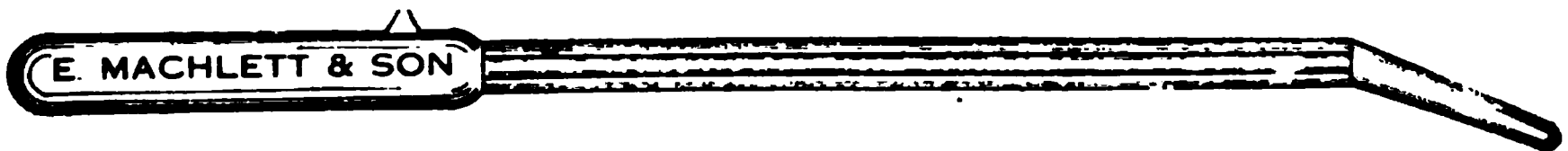


FIG. 1. INSULATED NASAL ELECTRODE.

vacuum tube, ten minutes to each nostril, with absolute relief of the acute conditions, for which he had no other treatment.

Hay Fever. Seven cases. Treated with bland oil atomization, and insulated low vacuum tube (Fig. 1), with coil high frequency current to each nostril for ten minutes. The most acute case was cured by two treatments; four cases by one; and two with asthma relieved by first and cured after five or six administrations.

E. S., aet. 50, male. January 17th, 1910. Patient had acute bronchitis, with laryngitis. Symptoms of toxæmia, with vague rheumatic pains, and headaches were also present. He was treated at 11 A.M. with light and vibratory massage of spine and chest, followed by the static wave current over the abdomen for twenty minutes. He returned to business and required no other treatment.

A. R., aet. 38, male. September 21, 1909. He had been complaining for ten days, and was confined to bed on Sep-

*Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association at Saratoga Springs, N. Y., September 15th, 1911.

tember 21, with a temperature of 104.1 degrees F., pulse 130, respiration 27. There was diffused pain, coated tongue, diarrhoea with the characteristic typhoid stools, rash or petechiæ scattered over trunk, constituting all the symptoms of enteric fever. Intestinal antiseptics and mercurials were given with milk diet. He was treated twice daily for thirty minutes with the fifty c. p. incandescent lamp. On September 22d, the morning temperature was 104.1 degrees F. and the evening 104.1 degrees F. On the 23d at 5 P.M. the temperature was 102 degrees. On September 24th, morning, 101 degrees, evening, 102.5 degrees. On September 25th, morning 100.5 degrees and evening 101.5 degrees. On September 26th, the morning temperature was 98.6 degrees and the evening 99. From this on the temperature was normal and the patient was discharged fully convalescent on October 12th.

M. A., aet. 8, female. When seen on June 26th, 1910, the patient had a temperature of 104.5 degrees F., pulse 132, respiration 30, face flushed, eyes suffused, tongue heavily coated, constipation with some tympanitis. Had shown lassitude for a day or two. There was no eruption. She was put upon antiseptic and mercurial treatment. On June 27th there was no change. A high enema was ordered at 2 P.M., which brought about copious evacuations, but no change in conditions. The temperature at 5 P.M. was 104.5 degrees. On June 28th, body light treatment was administered for twenty minutes at 11 A.M., and former treatment continued. The temperature at 5 P.M. was 102.2 degrees, pulse 118. On the 29th, the x-ray was given over the abdomen for twelve minutes. The temperature at 5.30 P.M. was 101.5 degrees. On June 30th, light was given. The morning temperature was 100 degrees, and the evening 99. On July 1st the morning temperature was 98 degrees, remaining subnormal until July 8th, when both the temperature and patient were normal.

E. T., aet. 20 years, male. This patient was first seen on May 23d at 5.30 P.M., having come home from the Virginia Military Institute on leave. He had been feeling badly for about ten days; first with sore throat, and later showed symptoms of enteric fever. The temperature at 11 P.M. on the 22d had been 105 degrees F. At hour noted it was 103 degrees. The face was ashen; the temples dusky, and appearance cadaverous. The pulse was 102, and there was some

cough. The urine was normal except for the presence of indican. The characteristic eruption was marked over the shoulders, chest and abdomen. He was placed on intestinal antiseptics, mercurial, and strictly milk diet. The x-ray was applied over the abdomen for twenty minutes. On May 24th the morning temperature was 101 degrees, arterial tension 140 mm. Body light treatment was given at 11 A.M. for thirty minutes, followed by the static wave current to chest for twenty minutes. The evening temperature was 99.3 degrees, pulse 100. Eff. citrate of magnesia was ordered for obstipation. On May 25th the physiognomy was decidedly improved, the skin was clearing, and the tension was 135 mm. The morning temperature was 98.4 degrees, and pulse 72. He had a restless night, free action from the citrate of magnesia, the evacuations very offensive. There was profuse perspiration during the night, the skin having been previously dry and harsh. The cough was entirely gone. From this on to June 1st, the temperature ranged from 97.4 to 98.4 degrees, becoming normal on June 2d, on which date the arterial tension was 118 mm., with absolute return to health and strength. Light treatments to the trunk with static wave current to the chest were given on alternate days, and abdominal raying for twelve minutes on the days intervening. He returned to the Institute and resumed his studies the following week.

These cases would seem to establish beyond a doubt the germicidal and tonic effects of these modalities, and in hay fever and enteric fever they bring about results heretofore unattained by other methods; their action being so certain that the physician is fully justified in having these cases come to his office, or carried there. Further investigation and reports in the treatment of these conditions is earnestly desired for should the experiences of others coincide with those of the writer, their importance to suffering humanity is beyond estimate.

700 S. Jefferson St.

Discussion.

Dr. William L. Clark, Philadelphia. Will the Doctor tell us his technique in the treatment of hay fever?

Dr. William B. Snow, New York. I think a clinical report like this is one of the strongest arguments in favor of this great principle of the antiseptic or destructive action of light

and the x-ray upon germ life. I have been impressed for the past five years with these truths, as set forth in my paper read before the Association last year. Dr. Tice has carried out the principles then suggested, and has obtained these results. When Dr. Tice has been able to have his patients suffering with these critical conditions come to his office for treatment, what are we to expect from hospital treatment of the same kind? It may take perhaps twenty years—perhaps but ten—or perhaps in five years the medical profession may come to the full realization of the possibilities of radiant light and heat and the x-ray in the treatment of infectious diseases. I know Dr. Tice too well to question a word he has said. While many of these statements may seem exaggerated, I know from personal experience in similar cases, and my acquaintance with the author, that they are all true.

I wish that Dr. Condict would tell us of the effects of radiant light and heat in the treatment of amebic dysentery. She has had an experience which drove her from her missionary field, to be promptly relieved from a condition which has resulted in the death of very many useful people. The effects of light in a case such as she will report are so remarkable that there is justification for making very strong statements in regard to its effects in enteric conditions, indicating the value of radiant light and heat in the treatment of intestinal infection.

The future of medicine will not rely upon so-called intestinal antiseptics nor on antitoxines in most cases, but upon the destruction of germs by internal and external forces, wherever they are found. Two forces, the increase of the local tissue resistance of the patient by the induction of active hyperemia in the field of infection, and the depressing effects of these same agents upon the germs in the field of infection—two coincident effects, which as congeners, work in a two-fold way upon the infectious processes. These principles have been worked out by many of us over and over again in the process of treating external and internal infections. It applies in the same way to the treatment of tubercular adenitis, prostatitis, arthritis, peritonitis as to pulmonary tuberculosis, and to all types of accessible infections that are susceptible to the natural defences. The possibilities are beyond any present day comprehension, and so few of us are in a position to make positive statements that it is all but impossible to expect the medical profession at large to follow or accept them at once. We may ask, that the members of the profession comprised in this Association, wherever they are, and in whatever field of work engaged will use their influence for humanity's sake, to make these things known.

Dr. Alice B. Condict, Orange, N. J. I have had amebic dysentery twice. The first time I got it when the great famine

was on in India, and I had to see 150 patients a day in a great famine camp. I had no one to help me. They would sometimes come and catch hold of my dress and cry, "Oh Missy, I am the worst one; help me." By these contacts I got thoroughly infected, directly on my hand, on my face, or perhaps into my mouth. The attack was fearful, and I had to leave India. The next time I went back I went up in the north of India. There I treated patients near the banks of the Ganges. They throw their dead right into the river, thinking that in this way to have them go straight to Heaven, to have them die in the water if possible, and if they do not die in the water, they throw their dead bodies in. I always told my servant to boil every drop of water. I fear, however, that sometimes the water was not boiled. While I was there the dysentery was very prevalent, and I was again taken down with it. I tried every means, but got no better. I came to the conclusion that because I had a rise of temperature with this bowel trouble, that I must have tubercular trouble and decided to go to Kalka, the great research place for all India. Our own country woman, Mary Leiter, who was Lady Curzon, was the means of establishing that research institute. I went there, and they examined me thoroughly. They took the warm mucus, directly after it was discharged and put it under the microscope, and took pains to have my case thoroughly examined. Colonel Semple, one of the most able English physicians there, the second day called me into his laboratory, and assured me that it was not tuberculosis. He showed me the amebæ under the microscope.

The English specialists there said that I must go straight out of India. They did everything that could be done for me while there, almost poisoning me with corrosive sublimate, using it in colonic flushings, and also by the mouth. I had every treatment that the best English physicians could give. I was doing too good work there to leave if I could get along at all. One of the surgeons told me that if I would use santonin that may be that would deaden the amebæ so that they would not be so motile and I found yellow santonin the best thing to take internally. I persisted for a year and a half, doing my work with this amebic dysentery every little while getting worse. I would get better, and then worse again. I went on in that way for a year and a half. At last I was growing so very weak that I saw that I would have to get away. So I left India last November. I reached New York two days before Christmas, and was so very ill that they took me almost in their arms up to Morristown, N. J., and put me to bed. I was so cold, that nothing that could be done would make me warm. As soon as I was a little better they took me down to Dr. Snow's office. I felt that Dr. Snow would cure me with light, or if not with the light, then with

the x-ray. After I had had five treatments with the light, that characteristic mucus disappeared. Amebic mucus is not the tinged, pink mucus that you see in ordinary dysentery, but is perfectly clear, with little, fine points of bright red blood. If you put one of these under your microscope you will find a colony of amebæ. These colonies of amebæ disappeared from the discharges after the fifth treatment. I kept the light treatments up for about two months. Then I was all right, and I am all right now. I resumed my work in Orange, N. J., and was so occupied that I forgot all about myself. In August, with the hot weather, and perhaps some foolish eating, from the folds of the intestines, hidden away, up popped the amebæ again. I found them under my microscope. In my own office I then again applied the light, and I have had no more of it. After two treatments with the light the colonies again disappeared. I shall keep up the use of the light at least every other day for six months to come.

The specialists in India, who come from Saint Patrick Manson are perhaps world wide authorities on this subject, told me that I might do what I like, I would never get free of it under a year and a half, or it might take two years. "You will have to keep yourself in trim. Whatever helps you you have got to do for a year and a half to two years." I believe that the use of radiant light and heat is a wonderful revolution in the treatment of amebic dysentery.

Dr. Tice in closing. I do not know that I have anything further to say other than that I am so thoroughly convinced of the efficiency of light and the x-ray in infections, that I cannot think of any sort of cases of infection that I would not approach without the least fear. I have been trying all summer to get hold of a case of pellagra, but unfortunately the cases have been so far advanced that they could not be carried to my office. I would not hesitate a moment in taking a case of smallpox.

In regard to the technique in hay fever. This is a thing that surprised me. I told some of my medical friends in Roanoke what I had done, and I did not blame them for doubting my word. In the acute cases the patients have fever, chills, weakness and the local symptoms. The only thing I did for these cases, except in the old cases of asthma, was to spray the nostrils with a bland oily spray, and use a low vacuum insulated nasal vacuum electrode, using at first just sufficient spark-gap to get the flow of current. I do not think that the static machine is suitable for these cases, because they are so tender. I treated all my cases from the coil. I used it inside the nose, from five to ten minutes in each nostril. I use the insulated nasal tube because from the non-insulated I found that some sparks followed the hairs of the nostril.

DIET THERAPY.*

BY G. C. SMITH, M.D., BOSTON, MASS.

I feel deeply honored to be called upon by your august and erudite society to speak upon such a trite and hackneyed subject, because it is evidence of either awakened interest in an old method of treatment, or that you believe that the last word has not yet been said in diet therapy.

I. History.

Diet therapy is undoubtedly the oldest therapy. We read in Holy Writ, "Take no thought of the morrow, what ye shall eat or what ye shall drink," etc. The early records of Egyptian days show that when a man was suffering from an abdominal disease he was fasted and dieted. Indeed, in ancient times so far as we know the world of bacilli was unknown and therefore infection, in an etiological sense, did not appear as to-day. Whatever entered man as food that disagreed with him, defiled him and must be gotten out of him.

Down through the Middle Ages little was done with dietetic treatment. One has only to study the portraits of some of the great masters like Rubens and Franz Hals to realize the extent to which gormandizing was carried in those days, and the apparently great respect with which corpulency was held by the admirers of the human form.

A little more than a century ago some awakening in this subject occurred, and much clinical work was done, but it was not till half a century later that the scientific basis of our present method of therapy was established by Voit, Rubner and others. Many theories have been exploited and tried out during the last twenty-five years, and found wanting, like the uric acid theory of Haig, the Salsbury diet, the vegetarian diet, the Kneipp cure, the grape cure, the milk cure, and finally, the lactic acid bacilli. All of these diet cures have unquestionably done much good by stimulating better thought and encouraging further experimentation by clinicians and physiological chemists till now we have a scientifically accurate working basis for establishing our therapy.

*Read before the New England Electro-Therapeutic Association in Boston at the April meeting.

II. *The Working Basis of Diet Therapy.*

All foodstuffs are divided into *proteins*, *carbohydrates* and *fats*, water and minerals. The *proteins* have the power to build up the body and to furnish heat and energy to it. The *carbohydrates* may furnish heat and energy and also be transformed into fat and stored up in the system. The *fats* furnish heat and energy and may be stored up in the system. Water constitutes about 60 per cent. by weight of the entire body and aids materially in the processes of metabolism, and under certain conditions, like an accumulation of salt in the body tissues, may be withheld by virtue of its affinity for salt. The mineral salts serve to build up the body tissues and aid in metabolism.

The fats and carbohydrates contain carbon in excess and are therefore called carbonaceous, while nitrogen is the conspicuous element of the proteins. It is estimated that the carbonaceous foods which we take comprise all the fats, carbohydrates, and two-thirds of the proteins. The nitrogenous portion is nearly all found in the remaining one-third of the proteins.

Now, in order to arrange a diet table suitable for any individual case it is necessary to know accurately the amount of these different elements, carbohydrates, proteins and fats, in each article of food; also to know the caloric value of each element. For this purpose some unit of measure must be adopted, and the one usually accepted is the calorie. This, in brief, represents the heat value of one gram of the different ingredients. The calorie usually adopted in the making up of tables was taken from Rubner, which represents one gram of protein and carbohydrate as equivalent to 4.1 calories and one gram of fat as equivalent to 9.3 calories. Then, as so much of our food contains mixed quantities of protein, carbohydrate and fat, it is only necessary that we should know the percentage of each to make our computation complete, for then we have merely to multiply the number of grams of protein, carbohydrate or fat by the number of calories in one gram of each, to give us the equivalent of the different kinds of food in calories. And just here I would like to impress upon your minds the necessity of remembering a very important difference in the combustion of different foods without and within the body. Some foods, for instance, steaks, chops

and eggs, are nearly all utilized in the system; while the proteins of vegetables, as well as the cellulose, may escape digestion and absorption. Butter and cream are nearly all absorbed, while at least 90 per cent. of olive oil and meat fats escape absorption.

Again, the arrangement of the different elements of food in combination, as well as the appetite for such foods, affect very much the chemistry which takes place in them during the digestive process. Much more starch of potato, bread and rice undergoes metabolism than that of bran, spinach or cabbage. Then, we may understand that the system does not receive as many calories as the food represents before it is given.

In this connection we can clearly see that clinical study of individual cases is even more necessary than the laboratory work done on the case, but the two should go on hand in hand.

Now, the question may arise in many of your minds whether it is necessary or not to make an exact computation of the number of calories of proteins, carbohydrates and fat in every individual case you have to prescribe a diet for, and if so, will the burden upon your shoulders not be too much for you among your many other arduous duties? In reply I would state that in the great majority of cases *it will not be necessary* for the reason that you will have more obesity cases, with the exception of cardiacs and diabetics, to treat dietetically than all the others combined, and you will soon learn that in the treatment of obese there are two essential points to remember:

(1) To reduce your carbohydrates to a minimum, excluding all sweets, and giving only food of low percentage starch, like potato and all other vegetables, and eliminating all cereals, bread, and rice; and

(2) Allowing a maximum amount of protein, a moderate amount of fat, and an ample amount of unsweetened fruits.

On this diet your patients will lose from two to three pounds weekly, so that your scale after a little while becomes a good criterion by which to judge of your patient's condition and as to whether he is losing as fast or faster than you desire. If he chances to have a coincident cardiac disease you may find it necessary to keep him in bed for a few weeks on

separated or whole milk, a glassful every two hours, in which case he will lose from three-quarters of a pound to a pound daily.

On the other hand, if you have an emaciated person to build up, after fixing upon the proper excess of protein and carbohydrates necessary to make him gain, your scale then is sufficiently reliable. If, however, you have a diabetic or a cardio-renal case to manage, it will be necessary for you to accurately determine the number of calories you are giving, otherwise you will be unable to give your patient sufficient food.

No class of cases will try you so much as your diabetics in this regard, and after you have carried along one severe case of diabetes for several weeks on a proper diet, I am perfectly convinced you will have little trouble studying calories for patients with any other affection.

What is the daily amount of protein, carbohydrate and fat requirement of the system? Very much time has been given in the past to the study of the protein element of our food, first, with regard to its absorption and elimination, and second, to the daily requirement in health and disease.

As you know, the proteins entering the system are first converted into peptones and albumoses and finally into amino acids which are absorbed by the endothelial cells of the intestine, going directly to the various cells of the body through the circulation. It has been shown, however, by the Eck fistula between the portal vein and the vena cava that animals fed upon a meat diet will show symptoms of poisoning, which fact leads us to believe that the portal vein carries at least some of the amino acids to the liver for further elaboration:

It also has been shown that the average amount of protein daily given to a normal individual is about 100 grams, containing 16 grams of nitrogen and also that about 16 grams of nitrogen is excreted daily. Now it is fair to assume that if less is excreted than taken in, too much protein is being given and stored in the system; while if more is excreted than taken, then the excess must come from breaking down of cells of the body which, if kept up, will lead to emaciation and weakness.

For the last 30 years we have pinned our faith to the Voit standard of 120 grams of protein daily in health for an adult man weighing 157 pounds at light work. Recently Chittenden has proven to his own satisfaction that one-half of Voit's

findings, or 60 grams of protein daily, is all that is necessary. The best clinical evidence, however, would go to show that the daily amount of protein used in sickness as well as health varies from about 40 to 160 grams. This great variation of results obtained by different observers may be expected as in many instances the experiments have been made with the purpose of obtaining the maximum amount of protein that could be utilized by the system; while others have had for their object the minimum amount. Among the many inferences to be drawn from the clinical and physical data to date upon this subject, the most important may be briefly cited:

(1) If more protein is given for some time than can be eliminated an extra tax is put upon the kidneys and circulatory organs and finally upon the nervous system, causing albuminuria, blocking of the uriniferous tubules, palpitations, increase of blood pressure, headaches from vaso-motor affections, or toxins from intestinal stasis and putrefaction.

(2) In cases where the eliminative organs are to be spared, like nephritis, it is wise to give *too little* rather than *too much protein*, but in this connection one should not be guided by most text-books, which advise cutting out all meat and other animal proteins save milk, while increasing the vegetable proteins, carbohydrates and fats, since these patients will often assimilate meat albumen, cheese, eggs and milk better than vegetable protein, and someone of the former better than the others. Thus meat albumen may often be better assimilated than egg or cheese albumen, and vice versa. At the same time it is well to remember that as a rule food containing the highest percentage of protein, like meat, is more apt to block the kidneys than that containing the lower percentage, like milk. The best cue as to which will be best metabolized by the system is the taste of the patient and the result of the urinary analysis.

I am in the habit of giving my nephritics one quart of milk daily, meat both red and white as they prefer, as I can see no difference in the use of them, and also eggs and cheese of the non-constipating type. We may have to reduce the proteins in some cases, even below 40 grams.

(3) Again, in cases where it is of the utmost importance to increase the resistance of the patient as much as possible, as in tuberculosis, we should increase the proteins to the max-

imum amount compatible with good elimination. In extreme cases of nervous exhaustion, sepsis, pernicious anemia, leukemia without kidney complications, the most striking beneficial results are seen with the use of a maximum amount of protein, as in such instances they build up the system and increase resistance, thus warding off other complications.

(4) The patient's likes and dislikes for certain kinds of protein should be consulted, but it will often be found that they are based upon a false idea which some layman or doctor, perhaps ourselves, planted there twenty or thirty years ago, like the harm occasioned by taking meat as it is full of uric acid. Such patients should be told that rapid progress has been made in medicine and we are trying to keep pace with it. In other words, we should be charitable to their convictions and frank to confess our sins of omission, yet heroic to assert our good intentions for the future.

(5) The amount of protein must depend largely upon the kind of work to be done, whether it is inside or outside work.

The daily amount of carbohydrate required in health or disease varies much more in kind and quality, as it furnishes both heat and energy, which can also be furnished by fat, and it often becomes a question as to which should be used for this purpose, as in the arctic regions, for well known reasons, it is better to depend largely upon fat, it is cheaper, is easily taken care of and can be stored up in the system for a long time; while in the tropics a food which is quickly burned up in the system and its refuse eliminated is much more desirable, and therefore sugar and starch are better than fat.

Again, when emaciated patients are to be built up and increased in body weight, it is often found more practical to use large quantities of fat, as also in diabetics, when the system may be unable to tolerate even the smallest amount of starch and sugar, an enormous amount of fat may be taken up and the life of the patient at least prolonged, even if the case is not curable. In many instances very quick heat and energy is required by the system, when sugar in some form becomes the most useful carbohydrate as it is more rapidly combustible than starch. On long marches by the German and French infantries chocolate has become a pretty general food, as it is light and easily carried and can be frequently taken without requiring cooking.

Starchy food is generally made more digestible by cooking, although some recent experiments made by Fofanau and reported in the April number of the *Zeit. für Klinische Medecin* under the caption of "The Digestion and Absorption of Raw Starch," would seem to indicate that in the case of raw flour and oatmeal it is quite the same whether they are taken cooked or raw; while with apple, potato and other vegetable starches that have considerable cellulose, cooking very much favors its digestion. In his experiments he also showed that in cases of sub-acidity or sub-acidity with diarrhoea, and in a fermentative dyspepsia, as well as in pancreatic diseases, cooked starch is much better digested than raw. While in hyperacidity, starches raw or cooked are very poorly digested.

If the patient is to be gained in weight the carbohydrates of high percentage starch, like rice, 80 per cent., bread, 56 per cent., and sugar should be used. While if he is to be reduced, carbohydrates of low percentage starch, like potato, 20 per cent., and all the other vegetables ranging down to $1\frac{1}{2}$ per cent., with no sugar would be elected, but in either case fruit containing an inconsiderable amount of starch and a very low sugar content should be given—and just here let me say a word about fruit. It is one of the most valuable foods:

(1) Because it is palatable and improves the digestion and assimilation.

(2) It is a laxative, chemically, physically, and by carrying water into the bowel, as most fruits contain 95 per cent. or more water; and

(3) The most important of all, it enters the blood as an alkali and so helps alkalinize that fluid.

I am very tired of hearing new patients say that "My doctor does not allow me any fruit because he says I am full of uric acid," or that "I have too much acid of some kind in the system." Often the doctor has guessed at a diagnosis and if he has guessed right, his knowledge of what has been done by physiological chemists the past sixteen years in this respect is faulty, to say the least. I have not seen a patient during this time who could not take and be benefited by fruit and vegetable acids, and it is my custom to prescribe them two or three times daily.

The carbohydrates usually vary from 300 to 500 grams

daily. The ability of patients to digest them must be carefully studied; some can take only well-cooked starch and in very small amounts without suffering with gas; while others may be able to digest very large quantities. Some will digest sugar better than starch and some kinds of starch, for instance, potato or oatmeal, better than rice.

Fat forms, roughly speaking, 15 per cent. of the average individual by weight. Some fats are better absorbed than others. The average amount of fat required for daily use in the healthy adult is estimated at 150 grams, but this will, of course, depend very much upon the kind that is used, and whether the carbohydrate is given in a large or small amount.

Fat is much slower of digestion and absorption than carbohydrate, and the amount of fat to be given a patient depends upon his power of digestion, the caloric need of the patient, and upon the climate, as well as upon his pocket book. In emaciating diseases and in those where for any reason carbohydrates are not advisable, the fats should predominate. The amount usually given varies from 50 to 100 grams, but if the amount of protein and carbohydrate has already been decided upon of course enough fat must be given to make up the required amount of calories for the patient.

Now, as to the total number of calories in 24 hours. It must be said that the amount allowed to an adult male, weighing 157 pounds, is generally conceded to be from 2,500 to 3,500, that is, from about 35 to 40 calories per kilo of body weight. It should be remembered, however, that babes and older children require a much larger number of calories per body weight, also, a proportionally larger amount of protein than adults.

About 6 per cent. of the body weight is made up of mineral salts, being deposited mainly in the skeleton and teeth. They furnish so little heat and energy that they may be disregarded when figuring calories.

Water is absorbed in the small intestines, no doubt in about the same amount as the intestinal juices are supplied to the intestine, but most of the water drunk is absorbed from the colon. It should play no role in figuring the amount of calories required by the system, neither in estimating gain or loss of fat. Of course, every medical man knows that you may

increase a man's weight by pouring water into him, but you cannot increase his fat in this way.

III. How to Adapt Your Patient's Diet to His Need.

Given then a strange patient sent in for a diet, what is to be done?

(1) Thoroughly examine him and make a correct diagnosis if possible. If, however, you are uncertain, put him under observation for a short period and study his symptoms and then, if necessary, call in some colleague to help you diagnose the case.

(2) Decide upon the number of calories required. If the affection is one to be benefited by diet you can usually count upon some of his symptoms having been caused by his foregoing diet, *e.g.*, if he has diabetes, obesity, cardiac, or renal disease, constipation or diarrhoea, some signs at least of the affection will be due to the kind of food that he has been taking in excess, therefore you should make it a point to incorporate in his rational history a statement of what his meals consist. You will usually find in this climate that he is taking an excess of the foods containing a high percentage starch, such as cereals, rice, bread, spaghetti and macaroni, with perhaps considerable sugar. More rarely he may be taking an excess of the proteins, especially meat. In either instance if you were to immediately reduce the excessive amount of this food to a minimum, increasing the other elements of the diet, with no other change whatever your patient would immediately improve; but the better and more scientific way is to figure out his caloric requirement for proteins, carbohydrates and fats, and even then to reduce the elements which are least needed in the system to an amount considerably under your mathematical computation, making up the balance of the calories out of the other two elements.

A very common error in dieting two patients suffering with the same affection, is to give them precisely the same kinds of foods. To illustrate: Two cases of emaciation due to a chronic colitis are to be built up. One may perhaps be accompanied with acute colic and abundant thick, tenacious mucus, ribbon-like stools; while the other has frequent, soft painless movements, with a little soft gelatinous mucus floating on top or incorporated with the feces. Now, the former

will be much benefited and eventually cured by a coarse, mechanically stimulating diet; while the latter will require a non-irritating and soothing menu. Further, a careful microscopical examination of such stools will usually show an excess of fat in the latter case, which would naturally suggest a change of the kind of fat being given, with a restriction of the amount; while in the former the microscope finding would show no fat, in which instance the fat should be very much increased.

Further, two cases of obesity are sent in for reduction and a thorough examination of them shows that one has cardiac disease, mitral insufficiency, uncompensated, with congestion of the liver and edema of the legs; the other, is simply obesity in an otherwise healthy man.

Now, the latter can be readily reduced while pursuing his usual avocation by a diet which consists of 120 grams, or more, of protein and a very low carbohydrate and fat content; while the former must be given a diet which has three points in view:

(1) To relieve his constipation and create, in fact, loose movements of the bowels.

(2) To cure his obesity.

(3) To relieve his heart by a reduction in weight.

You can readily see, then, that his diet must be a coarse laxative one, while at the same time it must be restricted in the fat making elements.

Or, again, one such patient may suffer with constipation, while the other has diarrhoea. You will readily see in both instances that the fat making food must be reduced in quantity, but the quality may be so changed as, in one case, to relieve the constipation, and in the other to cure the diarrhoea. It is a mistake to think patients who have diarrhoea cannot take fruit, for instance. I have not seen a case of diarrhoea, for years, to whom I could not give some kinds of fruit; the only parts to be avoided are the skins and seeds and some kinds must be cooked. The action of fruit has already been alluded to.

Now, again, in cases of diabetes of a mild degree, say one per cent. sugar, some carbohydrates in varying amounts are beneficial, and considerable experimentation will be necessary to find out which are best tolerated, and then the patient

should be given all he can digest without increasing the amount of sugar in the urine. Others, of a severer type, cannot take any carbohydrates without increasing the amount of sugar and, as you know, it is unsafe to omit carbohydrate for a long time for fear of diacetic acid poisoning, one should be very cautious to select foods containing the lowest percentage starch for such cases and at the same time bulky foods with which fats in considerable amount may be introduced. These are just the cases requiring much increase in the amount of fats over the normal.

I think enough has been said on this point to make clear the importance of carefully arranging a diet for each individual patient, rather than for his disease, and this only emphasizes the trite saying, "Treat your patient and not the disease." This is as true in *diet* therapy as in *drug* therapy.

IV. Relative Advantages of Diet Therapy.

Food, including alcohol, causes most all our diseases except those caused by infections and toxic agents like nicotin, lead, mercury, etc., and in combatting disease, as our first object is to stop the cause, we would naturally, after ruling out toxic agents and infections, find that improper food and drink is the source of the disease and then seek out the special kind that is causing it. This may sound to a novice a very difficult task, but, as mentioned heretofore, it is usually a very simple one in that the patient has been taking this special kind of food to excess. I am sure it is not as difficult to find out the proper kind of food for your patients as the proper kind of medicine, and I was recently told by a medical man of very large experience that he believed it safe to say that 95 per cent. of the all-round practitioners to-day are treating their patients with no definite diet plan, but, on the contrary, are still giving drugs, not only to relieve symptoms of disease, but with the hope of curing the disease.

I am repeatedly obliged to listen to the old counsel to the patient, "Take a light diet," "Take a solid diet," "Take a liquid diet," with no more definite detailed advice as to what the solids or liquids shall be. Now, to one patient a solid diet means corned beef and cabbage, to another dry toast, to another rice and cream; while a liquid diet may mean to one

beef tea, to another gruel, to another malted or skimmed milk, and so on.

With regard to the amount of liquids to be drunk in a day the usual counsel is, "Drink a lot of water" or "Avoid drinking." In other words, patients are left to their own devices as to what they shall eat and drink.

Now, in this enlightened day, although very few of our medical schools have yet deemed it wise to give courses in diet therapy, there is no reasonable, thinking physician who can for one moment argue against the advisability of carefully regulating the diet of his patients, still the statement of eminent medical men, frequently heard, that it is a bad idea to inculcate in the minds of our patients the necessity of following out a definite plan in their diet, has led many physicians to ignore this most important therapeutic method. I have never seen in the last fifteen years a patient who has become a monomaniac upon his diet.

Now, in this brief paper I have made no attempt to discuss the numerous other valuable therapies, and I am anxious to say in closing that I have faith in any and all therapeutic agents, whether originated by a layman or a medical man, which can be used either for the amelioration of symptoms, or the cure of disease.

I am frequently asked to recommend some new book on medical therapy and my usual suggestion in response is, to buy the best book that can be found on diagnosis, as I am very sure the principles of treatment are easier to think out than are the numerous intricacies and subtle points of diagnosis.

If this paper serves to carry conviction to the minds of any of this audience that the form of therapy suggested by it should enter into your consideration in the treatment of every individual case, its mission will have been fulfilled.

NOTES ON THE TREATMENT OF CANCER BY MEANS OF THE X-RAYS AND RADIUM.

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(Continued from page 224.)

In the early days following the dose which I had proved experimentally to be capable of producing absolute destruction of the tissues, I adopted the plan of giving a time exposure with a tube which I judged to be suitable for my purpose by the color produced when actuated by a spark of known length. I repeated these exposures at intervals until signs of irritation were manifest; when I gave my patient a rest for such a time as it seemed advisable. To-day I adopt the following methods of measurement: I use a dipper-break and tachimeter, and I pass through my tubes as near as possible one milliamperere of current. I choose a tube of a degree of hardness which I deem suitable for my requirements, and I filter or not according to the depth of the tissues I wish to treat. I prefer to administer a small dose at frequently repeated intervals rather than a large one at long intervals, as I find it more satisfactory to administer two full Sabaraud doses in this way, rather than one full dose at a sitting, and wait to note results. In some cases I treat the patients every day, in others at intervals of two or three days, and on each occasion I give one-quarter to one-half a full measured dose. Curiously enough this dose is very nearly identical with that given in the early days before any method of measurement was adopted. To filter the rays I use sheets of aluminum of varying thickness, and have tried, with some measure of success, a double screen composed of a thin sheet of aluminum and one thickness of silver foil. I enclose my tube in a lead glass shield, and use lead-glass adapters to protect the healthy tissues surrounding the diseased area. I can administer a large number of exposures without producing any ill-effect, and in some cases I have had patients under treatment for as long a period as three years with satisfactory results.

It is not my intention to bore you with the histories of a large number of cases. I shall be content with picking out one or two which, in my opinion, point to a moral, and which justify me in concluding that whilst I cannot hope to secure

a cure, I can modify the symptoms, prolong the life of the patient, and render the condition at least tolerable.

Case I. Mrs. F., aged 46, was sent to me for treatment in May, 1904. Her medical man in a letter to me stated that in his opinion, the patient would live but a few months, but that he thought the x-rays might possibly relieve her pain. She first discovered a growth in her left breast early in 1903, and consulted Mr. Jordon-Lloyd, who advised immediate and complete excision. This was carried out. A sweeping operation, in which the whole breast including the pectoral muscles was removed, and the axilla cleared out. Since the major operation she had had two recurrences removed at intervals of a few months, the last operation having taken place only four months back. At the time of her first visiting me, there were two occurrences, one just beneath, and one just above the left clavicle. Beneath this there was a space about the size of the palm of the hand in which the skin was tightly bound down to the ribs and intercostal muscles. The left arm was much swollen, oedematous, and painful. I commenced treatment by giving her a quarter pastille dose three times a week. After eight administrations the recurrences began to subside, and after twelve, as the skin over them was slightly red and much pigmented, I gave her a rest of several weeks. During this period, the recurrences had diminished to half their original size, the pain had gone, and the general health of the patient was much improved. The treatment was repeated at intervals and no signs of fresh recurrences appeared. After eighteen months' treatment I lost sight of her for two months when she again visited me. Over the position of the lower recurrence was an open ulcer which extended for about $1\frac{1}{2}$ in. over the previously mentioned patch of tightly bound down skin. She stated that a small abscess had formed, and that under the advice of her medical attendant she had continually poulticed it, until it broke down. I recommenced my treatments, and at the end of six weeks the ulcer had healed with the exception of a small sore immediately beneath the clavicle, which was kept from healing by being over-lapped by a roll of fat which projected over the clavicle. All attempts to heal this failed. The patient's health, however, continued good, and there was nothing in her appearance to suggest that she was suffering from a serious disease. In 1907, she caught

a. severe cold which was followed by an attack of bronchitis, and I only saw her occasionally for a period of over two months. Her condition suddenly became much worse. On examination I found signs of a growth about the size of an orange in her left lung. This was confirmed by Dr. Suckling, who agreed that it was a secondary growth. She lived only three weeks longer.

The chief points to be noted in this case are: (1) No further recurrences occurred; (2) Disappearance of the recurrences; (3) Healing of the ulcer; (4) Disappearance of pain; (5) Improved general health; (6) Prolongation of life from three months as predicted to three years.

Case II. Mrs. A. B., aged 43 (patient of Dr. Bradley of Coventry). Breast removed over twelve months previously. Entire surface covered with innumerable recurrences varying in size from a hazel nut to a millet seed. Patient badly nourished, suffering great pain, inability to sleep, accompanied by profuse sweating. Liver much enlarged. After twenty treatments the recurrences entirely disappeared, pain was relieved, and general health improved. The abdominal symptoms slightly increased. There were signs of fluid in the abdomen. The patient was sent home and told to come again on the slightest sign of recurrence. I never saw her again. I am informed that, although she lived for over two years, the recurrences never reappeared. The abdominal enlargement increased for a time, and she was subsequently tapped on several occasions, a large quantity of fluid being taken away. She died of a secondary growth over two years after giving up x-ray treatment.

The chief point to be noted in this case is the entire disappearance of recurrences in a most unfavorable case.

Case III. Mrs. J., aged 30. Patient now under treatment. This young woman had her right breast removed nine months back, recurrence first showed itself at the end of five months. Seven weeks ago she was sent for x-ray treatment. She had one large growth of the size of an egg, the skin over which was not implicated, and beneath this a small flat recurrence of the size of a halfpenny which involved the skin. After eight treatments the large growth has entirely disappeared. The skin over it being now loose, puckered, and deeply pigmented. The lower growth is slightly diminished in size.

I could quote dozens of similar cases, but these three are sufficient to prove my contention that, in the x-rays we have a therapeutic agent capable of producing results with, perhaps, the exception of radium, no agency at our command is capable of doing. In other cases in which the clinical appearances and symptoms were apparently similar, no effect was produced under apparently the same conditions of treatment. It is, of course, impossible to secure exactly the same conditions, and one is lead to think that to account for these varying results, we must either admit that the conditions of treatment were not similar, or that there must exist some difference in individual susceptibility on the part of the patient. We have, however, to face facts, and so far we must reluctantly admit that the differences in behavior are due to causes at present unknown.

During the last five years, I have irradiated a large number of cases of Cancer of the breast immediately after operation in the hope that, by so doing, the tendency to recurrence might be averted. What the results have been I am at present unable to state, and many years must elapse before we shall be in a position to form an opinion as to the advisability or otherwise of continuing this method.

One of the greatest difficulties which stand in the way of our arriving at an ultimate conclusion as to the effects produced by x-ray treatment arises from the fact of our inability to follow up the cases to the end. In Hospital practice directly the patients get a little better, they cease to attend, and either do not turn up again, or wait until the growth of the recurrences are so far advanced that they have reached a stage where further treatment is useless. In private practice the patients come only for special treatment, and we lose sight of them when they are once out of our hands. This state of things, which I am afraid cannot be remedied, greatly hampers our work, and renders it more and more difficult.

Recent discoveries regarding the action of secondary rays which emanate from metallic and other substances, bid fair to open up a new field of research of the greatest possible importance. Professor Barkla has discovered that these rays are much more absorbable, and more intensely ionizing, than the direct rays from the tubes themselves, and that the exact quality of ray which we desire to bring about a given result can be obtained at will. I am now engaged in making experi-

ments in this direction, and although at present I am not in a position to make a definite statement, I must admit that the results produced are satisfactory. Dr. William Mitchell, in an article published in the *British Medical Journal* of December 31 last, suggests that after operation for amputation of the breast, and before the wound is closed, the whole surface should be dusted over with sterilized carbonate of bismuth which would become incorporated with the tissues at the very points where recurrence would be most likely, and thus would be produced the very condition which Professor Barkla says is the ideal one for x-ray treatment. Granting that the bismuth thus used would not act as a direct irritant to the tissues, and would not produce any constitutional disturbance, this suggestion appears worthy of consideration, and I would like to know the opinion of those present as to the advisability of trying it.

I have found that the dusting over of ulcerating surfaces with carbonate or oxychloride of bismuth certainly modifies and renders more intense the radiations, whilst even in the case of unbroken skin (such as is found in ringworm) the effects of the rays are enhanced, and the necessary exposure shortened.

Many experiments in this direction suggest themselves in which no harm to the patient could arise even if they proved unsuccessful. Inert salts of the various metals could be applied in like manner, whilst the dusting over with finely powdered metals themselves is worthy also of a full and complete trial. The photographic effects of these secondary radiations can be easily demonstrated, when great differences in the actinic value of the secondary radiations will be observed.

This radiograph was produced by turning an Ilford special x-ray plate face downwards upon circles of various metals during exposure to the rays emitted from a hard tube. It will be seen that the resulting images differ very considerably in density, proving that the rays reflected differ in quality.

I cannot but think that a continuation of this line of research will yield us knowledge of considerable value, and I hope shortly to see published reports from the members of this Society proving or otherwise the value of the suggestions made.

In cases of malignant disease which fail to react, or in any

way respond to x-ray irradiation, I cannot but help thinking that our methods of administration must be at fault. It has been shown that by slightly altering the methods different results are obtained. In other words, the exact kind of radiation required to bring about a cure in a given case can only be secured as the result of more complete and effective methods of measurement, and a fuller knowledge of the action of the rays under varying conditions.

It was my intention to have dealt briefly with the various forms on malignant disease which I have treated, but want of time will prevent my doing this. I should, however, have liked to have said a few words on the treatment of epithelioma. The statistics published relating to the cure of epithelioma are always misleading, from the fact that on the Continent, and in America, no distinction is drawn between what we call rodent ulcer and epithelioma. We, in England, attempt to separate these two diseases, and to draw a distinct line of demarcation between them. I have already published the histories of several cases in which excellent results have arisen from x-ray treatment. The marked action of the rays on many of these cases lead me to the conclusion that they should be administered, in every case, prior to the taking of operative measures, and although I would not care to be so emphatic as Mr. Richard J. Cowen, who says, "A surgeon who operates in the case of epithelioma without first employing the x-rays to limit the growth, and destroy any glandular affection which may exist, accepts a very grave responsibility." I certainly urge most strongly the following out of this method.

My experience with radium is mostly confined to the treatment of epithelioma, owing to the fact that the amount of the substance at my command is too small to allow of its being effectively used in the treatment of large and deep-seated growths. In one case, in particular, I have been particularly struck with the excellent results secured. A gentleman, aged about 50, applied to me for treatment of a growth on his lower lip, which he refused to have excised, or to have examined microscopically. This growth, which was about the size of a hazel-nut, first made its appearance eighteen months previously, and despite continued treatment, refused to heal. Clinically it exhibited all the appearances of an epithelioma. It was ulcerated upon the surface, and was indurated at its base. It

was treated with a button containing one centigram of radium-bromide, which was applied for one hour and a quarter at each sitting, no filter being used. In all, six such applications were administered, with the result that, within two months, the growth had entirely disappeared, leaving an almost imperceptible scar, whilst the lip itself was soft and pliable and exhibited no signs of there having been anything wrong with it. Whether or not this was a case of true epithelioma, I cannot say, but that it was a grave condition which called for immediate and energetic treatment, there can be no doubt, and that it was cured, is a matter of certainty. In the cases in which I have used radium with success, I must admit that the results secured are excellent. Time alone will prove whether they are better than those achieved by the x-rays, and I would like to get an expression of opinion from those present this evening as to whether a recurrence is more or less common after radium treatment, than it is after treatment with the rays. We have at our disposal two other physical agencies which bid fair to take an important part in the treatment of malignant disease. The first of these is carbonic dioxide snow, upon which a paper of mine will be shortly published. The second is diathermy, a method of treatment which bids fair to produce excellent results and of which I hope to be able to say more on some future occasion.

In conclusion, whilst I can lay no claim that any of the agencies I have mentioned are capable of curing cancer, the results achieved are sufficiently promising to spur us on to further and renewed energy in an attempt to apply them with more scientific accuracy, in the hope that they may prove of more benefit to humanity in the future than they have done in the past.



Progress in Physical Therapeutics.

GYNECOLOGY AND ELECTRO-CHEMICAL SURGERY.

EDITED BY G. BETTON MASSEY, M.D.

Electric Treatment of Intestinal Obstruction and Post-operative Paralysis of the Bowel. William H. Dieffenbach, M.D. (*Jour. Am. Med. Assoc.*, April 1, 1911).

"1. The nurse prepares the bed with rubber sheets and padding to prevent leakage to the mattress, and a moderately flat and long bed-pan is placed under the buttocks.

"2. While the preparation is going on it has been my custom to advocate lavage of the stomach with a quart of weak saline solution (half-normal strength) at 105 F. so as to clear the stomach of mucus, bile or other debris, and check vomiting, which is usually present in these cases. Lavage also has a tendency to start downward peristalsis, especially if a small amount of liquid is left in the stomach for absorption.

"3. Three or four quarts of one-half strength normal saline solution at a temperature of 105 to 110 F. is prepared and kept hot on a radiator or stove.

"4. The rectal electrode, well lubricated, has attached to its distal end the rheophore connected with the negative pole of the galvanic battery and the central orifice of the electrode connects with a Davidson syringe. The electrode is introduced into the rectum as far as it will go and one quart of the fluid is slowly injected.

"5. A large sponge or felt electrode, at least 4 by 6 inches, well moistened in sterile or mild antiseptic solution, is connected with the positive pole and placed over the right hypogastrium so as to cover the ascending colon, and an assistant makes firm and even pressure on it, and if necessary remoistens the electrode. This pole may be shifted to the transverse colon and in some cases to the descending colon, but in the latter case its sphere of action will be over a small portion of the bowel.

"6. The galvanic rheostat is slowly moved until 10 to 15 M. A. are registered; after three minutes of electrolysis with liberation of chlorin ions which tend to relax tissues, the pole is reversed and the pole-changer kept going for from five to ten minutes more, reversing every thirty seconds. This interruption of the current produces marked contraction of the whole musculature of the abdomen and intestines and usually produces peristalsis and a desire for evacuation. If this desire

is strongly expressed, the electrode can be temporarily removed and the patient given a chance to evacuate feces or expel gas. Unless the evacuation has been eminently satisfactory, some more of the saline is again injected, and following the interrupted galvanic treatment, the attachment of the rheophores is made to the high-tension faradic coil and the current manipulated through the secondary coil, so as to produce a gradually increasing, then diminishing, contractile effect. The faradic treatment is given as strongly as the patient can stand without much distress, and is continued for five minutes. The withdrawal of the electrode is then usually followed by expulsion of fluid, feces and gas.

"7. After the electric treatment, the bed-pan is removed and the head of the bed elevated so that the patient is placed in an inclined position of from 25 to 45 degrees, so as to favor normal peristalsis. This is an important point in technic and should not be omitted. This position has been maintained in several cases for three days before recurring meteorism was checked.

"8. Following the treatment, normal saline retention enemas, one quart at 105 to 110 F., are given every two hours until normal conditions supervene.

"9. Repetition of the treatment is necessary in many cases. In one case which refused to respond, the sixth treatment, given after repeated failures during forty-eight hours, at last caused profuse evacuation. It is usual, when the condition is grave, to rest the patient for three hours before repeating the treatment. In chronic constipation or impaction a longer period (six to twelve hours) may be permitted to elapse before repeating the course of treatment.

"I have been called to a large number of these patients when they were practically *in extremis*, and when all varieties of enemas, stupes and drugs had been tried. Even in such desperate straits the electric enemas have, in a fair percentage of cases, proved successful.

"It cannot be emphasized too strongly that the earlier the electric enema is given in all cases, the better the prospects for success. When meteorism develops and bowel movement is not produced by the usual enema and other remedies, every hour lost with the use of turpentine, alum, asafetida and other enemas merely weakens the reactive power of the bowel and renders regeneration by means of the electric current more difficult.

"The battery used in these consists of a twenty-four dry-cell apparatus with galvanic and faradic (high tension) attachments, rheostat and milammeter, and is readily portable to the bedside."

The novelty in this valuable procedure is merely in its application to the emergency and post-operative work cited, in

a properly bold and persistent manner, for Dr. Curtis Webb, of London, showed me such an electrode more than a year ago and described a somewhat similar technic. Advances in electric-therapeutics are mainly on the lines of technic.

Patients doubtless die frequently in the general hospitals from post-operative intestinal paralysis because our hospital doctors know nothing of electro-therapeutics but the inefficient and trifling kind of the older neurologists. G. B. M.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

Hints on the Physical Therapy of High Blood Pressure. Wm. S. Sadler (*The Chicago Medical Recorder*, January 15, 1911).

Of the presence of high blood pressure and incipient arterial sclerosis in many cases that come before the physician, who will deny that there is a seeming constant and perceptible increase in the number of such cases. Of the value of physio-therapeutic methods volumes could be written. Sadler has found the following methods exceedingly useful in the treatment of high blood pressures.

1. The oxygen bath.
2. The Scotch rub, consisting of two basins of water, temperature 120 degrees, and 32 degrees respectively, with friction mitts several applications are made to each part of the body from the hot water, 120 degrees, followed by one brisk friction from the cold.
3. Electric-light baths, followed by cold mitten friction, etc.
4. Arc or incandescent light to the liver, followed by the neutral bath. (Warm baths should be moderately long, cold baths very short.)
5. The hot blanket pack, or hot hip and leg pack, followed by the cold towel rub.
6. The application of the heating compress to the legs, to be worn at night, preceded by the hot and cold leg bath.
7. High frequency electricity—auto-condensation.
8. Massage, vibration, etc., followed by short periods of rest.
9. Wearing the moist abdominal bandage at night.

A daily line of treatment for high blood-pressure, taken from the records of a typical case, runs as follows:

First day. Arc light to liver, followed by the Scotch rub. High frequency (auto-condensation 12 min.).

Second day. The oxygen bath (97 degrees F.), followed by rest.

Third day. Fomentations to the liver, followed by short electric-light bath and cold mitten friction.

Fourth day. Deep general massage. Auto condensation.

Fifth day. Incandescent light to liver, vibration (mild) to spine, followed by the Scotch rub.

Sixth day. The oxygen bath—standard technique.

Dietary, rest cure and other detailed attention to individual symptoms, not neglecting proper psychotherapy.

The following is a typical procedure for three days a week treatment given on alternate days:

Monday. The oxygen bath—standard technique.

Wednesday. Arc light to liver, hot foot bath, followed by the Scotch rub.

Friday. Fomentations to liver, short electric-light bath, cold mitten friction, deep massage or vibration.

Secondary Low Blood-Pressure: Abnormally low blood-pressure is helped by the judicious employment of physical exercise, ice-bag over the heart (15 min. at a time), long cold baths, short hot baths (before sweating), cold abdominal compress (5 min.), cold sitz baths.

Mistakes in Hydrotherapy.

Whenever a physician is called to see or is consulted by a patient, it is his duty both morally and professionally, to make himself acquainted with the actual function and structural state of his patient. Success in any form of medication, in dietetics, in hygiene and in hydrotherapeutic measures must be based essentially upon this accurate knowledge of the case in hand. Probably no measure of physio-therapy has suffered more frequently from abuse and mistakes than hydrotherapy, and it is doubtless due to the improper method of application and the failure to recognize the actual state of the patient that a large part of the difficulty hydrotherapy has had in winning a general recognition of its value. The basis of success in the application of water to diseased and disordered states of the human body therefore must be based upon the accurate analyses of all departures from the normal; that is to say, that the physician must possess an accurate clinical knowledge of the case he proposes to treat.

For the sake of argument, let us assume then that the physician is in possession of this knowledge. We find that this is not by any means sufficient. He must possess a knowledge of the physiological action of thermic and mechanical stimuli in order that he may understand its application. With these two well in hand, he is prepared to treat his patient right, if

he possesses a practical and adaptable knowledge of the technic of applying water to the body.

How often is the mistake made in fevers of employing baths or sponges at a low temperature for a short time, and frequently repeated, when in reality warmer ones, accompanied by much friction of longer duration will accomplish the end desired, while the other will cause failure. In cases of very high bodily temperature, where the extremities are cold and there is great vital depression, where the pulse is flickering and life seems hanging on a weakened thread, the individual may often be saved by the combination of cold packs to the trunk and the application of heat and friction to the extremities. How often have we, in this department called attention to the mistake of failing to apply friction in the Brand full bath and other lesser procedures in typhoid fever.

Again, the mistake is often made in the treatment of convalescent and anemic patients in using too high temperatures instead of the lower one of brief duration, with considerable mechanical stimulation. What a mistake it is where sitz baths are employed not to have the room warm and protect the exposed portions of the body from cold.

From the few instances here cited, it will become apparent that hydrotherapy requires as accurate knowledge of the patient as is needed in making medical or surgical diagnoses and applying treatment.

PHOTOTHERAPY.

HERBERT F. PITCHER, M.D.

Dr. Crothers in the *Physiologic Therapeutics*, speaking of the *Development of Electricity as a Remedial Agent*, shows that the possibilities of light, both electrical and sunlight, is nothing but vibratory waves that afford distinct clues to its future use.

He goes on to say that if light is simply vibratory waves striking the body like a supposed bombardment, it comes within the range of physics. The eye recognizes certain octaves which are approximately measured as vibrations from 500 to 700 billions per second. Beyond this there are no impressions. Sound is the same registration of vibratory activities. Only the range is limited from 32 to 36 thousand per second. Beyond this there is silence.

In view of these limitations, one cannot deny the possibilities of vibrations and vibratory actions going on beyond this, acting on the body in a thousand different ways, antagonizing disease and encouraging health. The sun's rays

falling on the body are followed by heat. This is simply the obstruction and transformation of the vibrations into another form of energy, or it may be transformed into electrical waves and the action and direction will change. This may be restorative, and under certain influences destructive. The most perfect growth and development depend upon the action of the sun. When this is absent, the defects are clearly evident. The most practical demonstration of the value of light is in lamps with reflectors back of them, usually the incandescent arc lights. This is simply to concentrate the vibrations on a special part of the body.

The sunlight and the electric light may be used in this way and its effects regulated by means of screens. Vibratory action in harmony with the body will bring strength and vigor. When the vibrations are intense they become destructive, as in x-ray, destroying germs and morbid growths, or the incandescent ray that stimulates healthy processes and limits breaking down of tissue. Light applied in varied forms has an unknown power which is yet to be studied.

Innumerable examples and confirmatory facts can be seen in everyday life and can be studied by the action of light on plants. The doctor directs the use of light in diseased conditions by the use of sunlight from mirrors or the electric light by lamps and reflectors. He speaks of the great benefit to pleurisy and pneumonia from the treatment by sunlight concentrated on the parts for an hour or two a day. The red rays can be screened off through a blue screen, or an electric lamp with reflectors can be used often.

It has great power to abort disease, limit inflammatory action and diminish local pain and irritation, but it must be remembered that this vibratory action may be destructive unless managed with care and discretion.

DERMATOLOGY.

EDITED BY HERBERT F. PITCHER, M.D.

Treatment of Angiomata with Radiotherapy.

Weil (*Paris Med.*) states that radiotherapy is the treatment par excellence for all kinds of angiomata, though it is little known. It is very easy of application and very effective. He has published twenty-six cases treated by the method at the Hospital Troussau. Of these fifteen were entirely cured; five are still under treatment; the remainder took but a few treatments.

Ten of the cases treated and cured were raised growths, soft in consistency, the base prolonged deeply into the tissues. Three cases were deep subdermic angiomata, with insignificant

alterations of the skin. Two cases were past nine stains. It is necessary in deep gravities to produce an inflammation. A white scar is substituted for a red mark. It is necessary to irradiate the lesion only, the other tissues being protected by lead shields perforated to expose the growth. If the growth is entirely superficial the full strength of the rays should be employed. If the lesions are both superficial and deep, one should combine sittings with rays filtered by plates of aluminum of a thickness of $\frac{1}{2}$ to 1 millimeter with sittings of the full strength of the tube. Hard tubes should be used. After the double irradiations a rest of fifteen days should be given. With angiomata with infiltrated bases and in plain angiomata at first stronger applications should be employed so as to get a more rapid action. When no erythema appears the applications should be employed so as to get a more rapid action. When erythema appears the applications should cease until the integuments look normal again.

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERICK DEKRAFT.

The Treatment of Arteriosclerosis. William H. Dieffenbach, M.D., *The Chironian*, May, 1911.

The author gives the following as causative factors.

I. Hypertension. This is found in certain chronic diseases such as gout, some forms of cardiac and renal disease.

Some think that the hypertension is primary, others that it is secondary. There are persons who show a rise in blood pressure at middle life without discoverable organic disease who subsequently become subject to arteriosclerosis and renal disease.

II. Involution. Their arteries are worn out early as the result of inherited taint or as the result of excessive wear and tear.

III. Chronic intoxication such as alcohol, lead, gout and syphilis.

IV. Over indulgences. Overstudy, excess of drinking, the stress and strain of modern life.

V. Overwork of the muscles increases the peripheral resistance and thereby raises blood pressure.

VI. Renal disease. Sondern holds that arteriosclerosis is due to the toxic influence of products of incomplete metabolism developed as a direct result of deficient body oxidation.

The retention of carbonic acid in the system, usually associated with dermal insufficiency.

Dieffenbach insists on avoiding liquids with meals, advises

the use of one pint of sour milk between three and four P.M., with a view to improving the intestinal bacterial flora, interdicts the use of coffee, tea and cocoa. Smoking in excess is prohibited. In old cases of arteriosclerosis smoking in moderation is beneficial. Air-baths promote the activity of the skin.

Gentle exercise in the open air is recommended.

The d'Arsonval high frequency auto-condensation currents are employed on every ambulant case. The treatment is given on a couch with the patient recumbent and relaxed, the bi-manual electrode placed in the hands or over the solar plexus region and a dosage of 400 m.a. given for 15 or 20 minutes daily at first, as improvement occurs every other day or twice weekly.

These applications reduce blood pressure from 10 to 20 points after a few treatments and if combined with hydrotherapy also produce marked circulatory improvement. In some cases the improvement is transitory, but in the majority of patients permanent improvement follows one or two months' treatment.

Beitrage zur klinischen Chirurgie. M. Hoffmann, Tübingen, February, 1911.

The writer speaks of the advantages of using high frequency currents for obliterating the lumen of the smaller blood-vessels by the method of "the cold cautery." He ligates the larger blood vessels. The smaller vessels can be quickly obliterated by the method without leaving any foreign body and with the additional advantage of sterilizing the tissues.

High Potential Electricity in Therapeutics. William Benham Snow, M.D., *The Cyclopedia of Medicine*, April, 1911.

The author says-high frequency currents are distinguished from static modalities by a complete absence of tissue contraction and by the production of a marked degree of heat in the tissues, due to the high amperage and high frequency of the current employed.

The element of heat production with the consequent induction of marked *hyperemia* when the direct d'Arsonval current is passed directly through an infected and inflammatory tissue, increases the tissue resistance as well as the number of phagocytes in the region infected. In this effect the high frequency currents are very similar in their action to radiant light and heat, which produce hyperemia not only on the surface but in the deeper structures when applied with a concentrated light, either from the electric arc or incandescent lamp. The effect of high frequency currents as employed for

the treatment of high arterial tension is one of the greatest discoveries in modern therapeutics. In most cases the blood pressure will fall from 10-20 mm. after each seance of 12 to 15 minutes, and under daily or alternate day treatment will be gradually lowered, so that it can easily be kept between 140-150 mm. of mercury, at which level there is no danger from apoplexy. When once reduced it may be controlled with less frequent administrations, and without danger of unfavorable effects. Instead of involving danger such administrations, except in the rare case in which the tension is compensatory and should not be lowered, are otherwise beneficial. The effects upon metabolism in the cases unable to take exercise are remarkable, as is evidenced by the increased elimination of solids in the urine and a well marked general improvement in the physical condition. Even in advanced cases of arteriosclerosis in which the arteries are so extensively hardened that no fall in blood pressure is produced—the tension persisting—a marked improvement in the general condition of the patient is produced and maintained by daily treatments.

High Frequency Currents in the Treatment of Arteriosclerosis. By Dr. Thomas E. Satterthwaite, *New York Medical Journal.*

His attention was first called to the beneficial action of high frequency currents in arteriosclerosis in 1901 in the case of a physician recovering from a mild cerebral hemorrhage. He had some paresis of the lower extremities and complete paralysis of the left masseter muscle, with severe muscular pains.

The application of long static sparks and fine needle spray gave both temporary and permanent relief. In another case of arteriosclerosis with aortic disease and cardiac hypertrophy in a lady aet. 65 with a maximum pressure of 200 m.m. Hg. where treatment with high frequency was begun February 17, 1909, treatments being given three times a week for fifteen to twenty minutes, the tension came down to 145 m.m. by April 17. Her husband, a well-known physician, said "she was in every way better; slept well, was less nervous, and felt much happier." He says "a diminution in arterial pressure is the regular sequel to the use of the high frequency current, but the seances should not be protracted beyond the time which the maximum pressure falls to the normal. A reduction beyond this point might be harmful."

Moutier states that while high frequency currents reduce arterial pressure, they are not uniformly effective, and may be inhibited by errors in diet, constipation, or various reasons. A reduction once obtained can be retained, at least for a period of three years without relapse.

Experience shows that while the pressure may not always be reduced at each sitting, there is a progressive fall as the weeks go by. The faradic current applied to the abdominal walls, where there is intestinal atony may be very helpful. Iodines and mercurials in syphilitic arteriosclerosis and iodides, iron and arsenic in gouty arteriosclerosis are surely indicated as is also the more or less general application of the high power incandescent lamp. It brings the blood to the surface and produces a sedative effect.

It is particularly pleasing to see favorable comment upon high frequency currents when this comes from such sources. Once the proper technique and physiological actions are more generally understood the public at large will be greatly benefited and much genuine pleasure will be the reward of physicians in general practice because of the sense of well being, general buoyancy of spirit, prolongation of useful lives and added strength of his patients. The action of high frequency currents and purely static currents have much in common. Increased nutrition, secretion, and excretion are produced by both.

The property inherent in static currents is a tendency to condense on the surface of charged bodies. The manner in which the discharge of this accumulated current is effected governs the mechanical effects produced. F. DeK.

RADIOGRAPHY.

EDITED BY FREDERICK M. LAW, M.D.

The Medico-Legal Aspect of the Roentgen Rays from the Standpoint of the Surgeon. By R. D. Mason, M.D., *American Journal of Surgery*.

In this paper which was criticized and passed by Attorney Frank Crawford, Dr. Mason has outlined very clearly the legal status of expert radiographic testimony in the courtroom. It is too long and technical a paper to be properly abstracted and should be read in full, but one or two points may be emphasized.

All courts recognize a radiograph as being competent evidence when properly supported by the testimony of one expert in radiography.

It is immaterial who made the picture, provided it is pre-

sented by a competent witness as a representation of his knowledge.

The statement that a radiograph can be made to falsely represent a part, has no validity, as it can falsify only just as much and more than the human being who takes it verifies it.

The use of the x-ray is so universally commended in the modern works on surgery and medicine that the surgeon who fails to apply them in doubtful cases may justly be accused of negligent practice.

In the case of x-ray burns the courts hold the physician liable to the same extent that they do in case of any other accident which may be the cause of injury. The physician should warn the patient against the possibility of accident in so far as this can be done without unnecessary fear, but if he does not take the patient fully into his confidence and if it can be shown that he used the skill that would be expected of a competent radiographer, he is not liable.

When the radiographer is called into court he should prepare himself very carefully by a study of the anatomy, physiology and pathology of the part and answer questions in the simplest possible way.

Dr. Mason closes by citing several questions that might be asked and the proper way to answer them and then gives the history of a number of cases where radiographs offered in evidence gave the balance in their favor.

BOOK REVIEWS.

ATLAS OF MICROSCOPIC DIAGNOSIS IN GYNECOLOGY. With Preface and Explanatory Text by Dr. Rudolf Joly, Priv. Doc. Chief Physician of the Gynecologic Clinic, University of Berlin. Only Authorized English Translation by P. W. Shedd, M.D., New York. With 52 Lithographs in Color and 2 Textual Figures. New York, Rebman Company, 1123 Broadway. Price, Cloth, \$5.50.

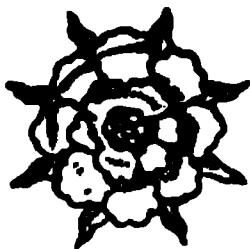
A work upon the technique of microscopic examination devoted to a special department of medicine, is a novelty. It is seldom that a work of this kind has been published. In gynecology, however, there are so many peculiar conditions that the microscope reveals, that a work of this sort will fill a valuable place in the library of the gynecologist as well as of the general practitioner. The technique of preparation and staining has been fully considered. The drawings and micrographs are of excellent quality, and are produced in colors, which give graphically a very excellent portrayal of the microscopical findings of the various conditions. No pains have been spared to make the work practical and scientifically accurate. The book contains twenty-six plates, besides including

in all fifty-two illustrations. The author and publishers are to be congratulated upon the excellency of every particular of this work.

* * *

WHAT SHALL I EAT? A Manual of Rational Feeding by Dr. F. X. Gouraud, formerly Chief of the Laboratory of the Medical Faculty of Paris. With a Preface by Prof. Armand Gautier, of Paris. Only Authorized Translation into the English Language by Francis J. Rebman. With a Glossary containing Definitions of the Principal Technical Terms, and an Index of Diseases referred to in the Text. New York: Rebman Company, 1123 Broadway. Price, Cloth, \$1.50.

The translator in his Preface has well said of this work that the "practical manner in which the author deals with the subject before him" is striking. He has given an impartial survey of the subject of dietetics, advancing the arguments of opposing authorities, leaving it to the reader to arrive at his own conclusions. The arrangement of the work is most practical and convenient for the reader, the author giving each article of food mentioned in the book, its actions, digestive functions, and how treated by the processes of assimilation, secretion and elimination. He also gives the reasons why food should be employed or rejected, according to the normal and pathological conditions of individual cases, with indications and contraindications which aid the student greatly in his choice of food. It is undoubtedly one of the most valuable books that could be placed in the hands of the busy practitioner, and we cordially recommend the work in the particulars as stated.



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THE ATTITUDE OF THE ENEMIES OF DR. WILEY.

THE charges that have been made against Dr. Wiley, chief of the Bureau of Chemistry of the Department of Agriculture, will be traced to the enemies of the reforms which he has wrought, and for which the American people are profoundly indebted to him for his energy and indefatigable labors.

The vicious producers of impure foods, and fake, so-called patent medicines, who have grown rich by imposing upon the credulity of the public have been stayed, and many of them have been thrown out of business by Dr. Wiley's efforts. There is still much to be accomplished in this direction, and the country can ill afford to have him displaced from the position that he so ably fills.

Technically analyzed, the charges are based upon conditions that in reality were to the government's advantage in retaining the services of experts. Why the Attorney-General should be permitted to pay legal experts larger fees than medical and chemical experts are allowed is not on account of their greater ability, but their greater presumption. In no case has a medical or chemical expert been allowed fees that are in any sense commensurate with those paid to legal experts. That this is so is an evidence that things are wrong; for in no class of endeavor is greater skill demanded than in

the services which Dr. Wiley and his assistants are called upon to render.

It cannot be possible that the President will call for the resignation of Dr. Wiley in accordance with the suggestions of his presumptuous Attorney-General. His sense of justice is too keen and his knowledge of affairs too great to allow such an injustice to the public. If Dr. Wiley was sometimes doggedly insistent upon what to his mind was right, though he may differ from other well intentioned individuals, it is certain that to this very quality the public are indebted for his great success in righting wrongs that have been intrenched for years until it seemed that right would never prevail, and would not but for the same dogged persistence of Dr. Wiley.

“SOME OF THE LATER-DAY ENDEAVORS IN THE TREATMENT OF DIABETES.”

IN a paper published in a recent issue of the *Medical Record* Dr. Heinrich Stern has considered the methods of treatment that have been advocated by numerous observers, including the employment of surrounding dry heat and the uses of electricity. He quotes from Dr. DeKraft's paper* concerning the uses of electricity, and concludes his observations with the following deductions: “1. The high frequency currents *per se* do not influence in one way or the other the intensity of either the glycosuria, aceturia, or acetonuria. 2. A diabetic glycosuria irreducible by diet cannot be reduced when high frequency currents are employed in addition thereto. 3. High frequency currents employed together with a suitable and well regulated diet will occasionally yield better results as far as the general condition of the patient is concerned than when an anti-diabetic regimen alone is being pursued. 4. Eventual benefits accruing from the combination treatment are more lasting when the patient is surrounded by a high external temperature. 5. Mild cases of diabetes are not at all benefited by the high frequency currents; neither is the preponderating majority of grave and advanced instances of the malady.”

These observations are an evidence of the author's want of experience or unscientific employment of electricity and preju-

*The Effect of High Frequency Currents in Diabetis Mellitus. JOURNAL OF ADVANCED THERAPEUTICS, February, 1910.

diced views. He does not seem to be willing to acknowledge the fact that electro-therapeutists can be internists. A better acquaintance with the men that are engaged in this work would disillusion him in this particular. It is evident, however, that his expressions are from a very narrow point of view, or an experience based upon inaccurate knowledge of the principles of action and the modern methods of using electricity. To say anything about the use of any form of electricity without more definite explanation would not enable any one to know whether he employed correct methods or not. His results, however, indicated that he did not. There is no science in which the method of employment counts for so much and where failure results more often from inexperience.

Considering the statement, there is an abundance of evidence that the first conclusion is faulty; for no one who has employed auto-condensation with the lowering of blood pressure and the static wave current over the pancreas, one or both, has failed to influence glycosuria, "aceturia, or acetonuria"; and furthermore, in some instances without strict attention to diet. This has been effected in the writer's experience and the experience of his associates in numerous cases. He, however, observes that high frequency currents with diet is often associated with some improvement, but nothing radical. In the fifth conclusion follows the inconsistent statement that mild cases of diabetes are not at all benefited by high frequency currents, whereas in the experience of the scientific electro-therapeutist, in all mild cases, the glycosuria promptly disappears. If observers who have had very little experience with electro-therapeutics knew more of the *modus operandi* and effects of these currents upon metabolism their conclusions would be far more valuable. Otherwise, criticisms and conclusions from seemingly prejudiced observers, whose experience may be very limited in the employment of high potential or other electrical currents, tends to prejudice the uninitiated, thereby deferring the final establishment of what is certain to be the eventual correct understanding of the principles of employment of electro-therapeutics.

THE TWENTY-FIRST ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

The meeting of the American Electro-Therapeutic Association to take place in Philadelphia, on the 5th, 6th, and 7th of September, promises to be one of the most interesting and entertaining in the history of the Association. If the cordial reception and entertainment accorded the Association at the session held in Philadelphia in 1906 is any index of what the Association has in store for it at the coming session, it will well repay the members of the Association to be present. The character of the appended program is also a guarantee that the scientific side will be of a character that will almost demand the presence of those who intend to keep pace with the work being done by the members of the Association.

For the benefit of those who are not members of the Association, it should be said that the membership is open to all members eligible to the American Medical Association. Blanks may be obtained from the editor of this journal or the secretary. Those not acquainted with members of the Association should send their credentials with their application and fee for membership. The fee for membership in the Association is \$5.00, which includes the annual subscription to the official organ.

Those who have attended the meetings of this Association look forward, as a rule, to it as one of the most entertaining and scientific occasions of the year.

The following scientific program, which will include the reports of the standing committees, will be presented at the coming session:

PROGRAMME.

1. President's address: History of the Development of High Potential Currents. Dr. Frederick De Kraft, New York.
2. Result of Treatment in a Few Cases of Floating Kidney. Dr. S. St. J. Wright, Akron, O.
3. X-Ray in the Treatment of Cancer of the Breast. Dr. J. N. Scott, Kansas City, Mo.
4. Static Electricity in Nervous and Mental Diseases. Dr. J. J. Kindred, Astoria, L. I.
5. The Modern Treatment of Cardio-Vascular Diseases. Dr. William Benham Snow, New York.
6. Experiences of a Pioneer Electro-Therapeutist in Mississippi. Dr. Rosa D. Wiss, Meridian, Miss.
7. The Rational Treatment of Tuberculosis. Dr. Arthur W. Yale, Philadelphia, Pa.
8. Clinical Benefits from the Employment of Electricity in Gastro-Therapeutics: Confirmed Results and Deductions from Over One Thousand Cases So Treated. Dr. Anthony Bassler, New York.

9. A Rational Muffler for the Static or High Frequency Spark. Dr. George E. Pfahler, Philadelphia.
10. Consultations Regarding X-Ray Dosage: The Physician's Duty to Prescribe X-Ray Earlier in Cancer. Dr. Sinclair Tousey, New York.
11. Roentgen Ray in Therapeutics. Dr. J. D. Gibson, Denver, Colo.
12. Elimination. Dr. Charles O. Files, Portland, Me.
13. The Symptom Complex Illustrated. Dr. Charles F. Mills, New York.
14. Paper, title to be given. Dr. Bergonie, Bordeaux, France.
15. Ionic Medication in Stiff Joints. Dr. Frank E. Peckham, Providence, R. I.
16. The Use of an Extra Spark Gap in Application of Certain Static Modalities. Dr. Francis B. Bishop, Washington, D. C.
17. Enforced Compensation. Dr. Gustave Werber, Washington, D. C.
18. Leucodescent Light in the Treatment of Tuberculosis and Nervous Diseases. Dr. Alice B. Condict, Orange, N. J.
19. Neurasthenia and Its Treatment by Electrical Methods. Dr. F. Howard Humphris, London, England.
20. The Treatment of Constipation. Dr. H. M. Imboden, Clifton Springs, N. Y.
21. Electro-therapy in Alaska. Dr. J. L. Myers, Ketchikan, Alaska.
22. Clinics on Ionic Surgery, Radium, etc., in the Treatment of Malignant Disease, by Drs. Massey, Newcomet and other members of the staff of the Oncologic Hospital.
23. Cases of Backward Minded Children Studied by Means of Skiagrams of the Teeth. Drs. J. Madison Taylor and Leon Kanaga, Philadelphia, Pa.
24. Is the Present Attitude of the Medical Profession Towards Physical Therapeutics Justifiable? Dr. J. C. Walton, Richmond, Va.
25. Arsenionization in Cancer: A Preliminary Note. Dr. G. Betton Massey, Philadelphia, Pa.
26. A Case of Acute Broncho-Pneumonia Relieved by the Static Wave Current. Dr. A. B. Hirsh, Philadelphia, Pa.
27. Radium. Dr. William S. Newcomet, Philadelphia, Pa.
28. Sub-acromial or Sub-deltoid Bursitis, Often Mistaken for Brachial Neuritis. Dr. Park B. Breneman, Lancaster, Pa.
29. Indications for Thermotherapy. Dr. Byron S. Price, New York.
30. High Potential Currents in the Treatment of Pellagra. Dr. D. H. Yates, Madison, Fla.
31. Treatment of Poliomyelitis Anterior. Dr. Grafton E. Day, Collingswood, N. J.
32. Report of a Case of Pyelonephritis Treated by the Static Wave Current. Dr. S. Leslie West, Philadelphia, Pa.

The following are the Committee of Arrangements for the Philadelphia meeting: G. Betton Massey, M.D., Chairman; G. E. Pfahler, M.D., Wm. L. Clark, M.D., Wm. S. Newcomet, M.D., C. B. Longnecker, M.D., Daniel McCarthy, M.D., Charles K. Mills, M.D., Albert E. Roussel, M.D., Charles S. Potts, M.D., S. Solis Cohn, M.D., Frank B. Baird, M.D., H. P. Boyer, M.D., A. B. Hirsh, M.D., J. Madison Taylor, M.D., J. W. Frank, M.D., S. Mason McCollin, M.D., H. H. Mudgett, M.D., A. R. Rainear, M.D., Wilbert J. Wolf, M.D., L. Willard Reading, M.D., A. W. Yale, M.D., Grafton E. Day, M.D., William Martin, M.D.

MODERN MALPRACTICE IN GYNÆCOLOGY.*

BY ARTHUR W. YALE, M.D.

There can be no higher calling than the dedication of one's life to the relief of suffering, and the conscientious physician finds his reward in the conquest of pain, and the prolongation of life. It is his duty, nay, rather his privilege, to maintain a high ethical standard, as like Merlin, he "follows the gleam" of knowledge wherever it may lead him. It is alike his duty and privilege to avail himself of new discoveries, new methods, and his motto should be the words of the dying Goethe, "More light."

The subject of malpractice is of vital importance to every practitioner having at heart the honor of the profession, and in inviting your attention to this topic, the writer would first quote the legal definition of the term.

Malpractice is the bad professional treatment of disease, pregnancy or bodily injury, from reprehensible ignorance, or carelessness, or with criminal intent.

With regard to that form of malpractice which consists in producing abortions, the state is especially severe, and stringent laws have been enacted for its prevention. This is readily explained by the fact that abortion directly affects the increase in the population, and is therefore a crime against the state, since it robs the state of citizens.

The operation of abortion is only permissible when a patient's life is in jeopardy, and even then the necessity must be attested by two physicians. One of our ex-Presidents has been an ardent champion of the cause of posterity, and has zealously promulgated the doctrine that in the earth's garden woman was destined to be a hardy annual, if not a perennial.

A major operation which is performed with startling frequency, and which vitally concerns the increase of the race, is that of oophorectomy. This statement will be corroborated by the following statistics compiled from last year's report of some of our leading hospitals. The figures given do not include oophorectomies alone, but embrace all operations involving the partial or entire removal of the female reproductive organs.

*Read at the Twentieth Annual Meeting of the American Electro-Therapeutic Association, at Saratoga Springs, September 15, 1910.

Bellevue, 224; Hahnemann, N. Y., 50; Gouverneur, 36; Harlem, 124; Fordham, 57; Presbyterian (Phila.), 204; Presbyterian, N. Y., 175; Memorial, 320; Roosevelt, 203; Samaritan, 212; Episcopal, 252.

A few years ago surgery of a radical type reigned supreme. The scriptural injunction "If thine eye offend thee, pluck it out," was applied with equal literalness to the other diseased members of the body. As in the early days of dentistry, the uniform remedy for toothache was extraction of the tooth, so in the dawn of surgery operation was the invariable "first aid to the injured."

The method of treating a diseased organ was to extirpate it, when possible. Was an ovary inflamed? Remove it. Was the other slightly affected? Better perform a double oophorectomy than run the risk of a second operation. As for the tubes, they were also involved, and their removal had best be included in the surgeon's work.

The success of these operations was attested by the fact that a goodly percentage of the patients recovered. True, they recovered from the physical shock, but what of the mental shock to a woman who has submitted to the removal of her ovaries? Deep down in the human heart is a desire for offspring, and the successful oophorectomy means that by the removal of the organs sacred to posterity, the supreme joy of motherhood is denied. Is it a light matter to destroy the hope of maternity which every wife worthy the name cherishes? Is it nothing to doom a home to childlessness?

But the pendulum had swung too far, and radical surgery was succeeded by the conservative type. The dentist no longer extracts the aching tooth, but exerts all his skill to save it. The surgeon seeks to preserve rather than extirpate, for to restore a diseased organ to the normal state calls for greater skill than to remove it.

Dr. Howard Kelly, in his admirable work, advocates conservatism in surgery, emphasizing strongly the mental shock to a patient in the thought of being unsexed. He terms conservatism, the goal of surgery, stating that the conserved structures are important to the highest welfare of the patient.

But conservative surgery, in its turn, has given place to physico-therapy, and the potent forces of nature are enlisted in the warfare against disease, accomplishing results hereto-

fore undreamed of. The writer would by no means disparage the work of internal medication, but the properly chosen modality, applied with discrimination, will accomplish the desired result with far more promptness and permanency than would be possible for any internal remedy. It is a radical method indeed to treat a diseased part by destroying it, and physico-therapy follows the more logical plan of overcoming the pathological condition, and restoring the normal state.

So brilliant has been its work that it is with hesitation that we now apply the term incurable to any pathological condition since many which have utterly failed to respond to other treatment have proven amenable to the proper modality, applied in the proper manner. We are living in a progressive age and the last decade has witnessed a remarkable advance in the science of medicine.

In no field has the work of advanced therapeutics been more remarkable than in that of gynecology, and the writer would cite a few instances of the remarkable results of treatment by physico-therapy in diseases of women.

Let us first consider endometritis. This, it is hardly necessary to state, occurs in three forms, simple, septic and specific. In the first form, if the membrane is hypertrophied, the follicles are many branched, with thickened epithelium, deposited in a regular layer. The vessels are increased in size and number, the muscular walls are thicker, and the lymph spaces larger. The epithelium is readily brushed off, and lymphoid cells fill the spaces about the follicles.

If the membrane is atrophied, the follicles are smaller, the lymph tissue not so rich in cells, the whole membrane abnormally thin. The menstrual blood readily coagulates, and the epithelium separates in shreds, or even as a whole cast.

Septic endometritis is an infected inflammation of the endometrium, usually caused by staphylococci, or streptococci. In its acute form the uterus is engorged with blood and enlarged. The mucosa is swollen, dark in color, and the number of vessels is increased. Pus cells cover the surface and fill the follicles, being found even in the lymphatics and lymph tissues, and staphylococci are everywhere in the membrane.

In the chronic form the same lesions occur, but in a less degree. Pus is produced in quantity in the glands, and on the surface of the membrane. The cocci may even penetrate the muscular wall and form an abscess.

Gonorrheal endometritis has the same lesions as the septic form. Pus is present, but sloughing does not ensue, and systemic infection is not as severe as in the septic form. In the chronic form the gonococci are in the follicles, lying beneath the epithelium, and do not enter so deeply into the mucosa. At each menstrual period there is an increase in the invasion.

It will be at once apparent to those familiar with physiotherapeutic modalities, that cases of this kind call for the production of hyperemia, with an increase in the number of the red blood cells and also in their activity, both in regard to their capacity for carrying oxygen, and their oxydizing power. If the parts are markedly hypertrophied, the Morton wave or bi-polar method may be used to advantage. A metal electrode is used in the vagina, and a wet pad or metal foil placed over the abdomen, slowly separating the pole pieces of a static machine, until the limit of the patient's tolerance is reached, and speeding the machine until about 150 sparks per minute occur. Twenty minutes of this treatment two or three times per week will produce a rapid depletion of the organ and induce involution.

In the atrophic form, the glass vacuum electrode, preferably an insulated one, should be placed in the vagina, connected to an Oudin or Tesla resonator. The writer has found the combined Oudin-Tesla resonator manufactured by the Van Houten-Tenbroeck Co. particularly effective, as by this method a high potential, high frequency current with slow interruptions can be produced, thus giving the advantages of slow high voltage, combined with the tonic effects similar to the Morton wave.

The writer would cite a case in illustration.

Case 1. Mrs. —, aged 36, four children, five miscarriages. Examination disclosed a relaxed and torn perineum and cervix, the uterus enlarged and tender, both ovaries and tubes enlarged, the left tube markedly tortuous and indurated. There was present profuse vaginal discharge, a stringy albuminous discharge from the cervix, and she suffered from dysmenorrhea.

The high frequency current was used in this case, twice a week, for twenty minutes, followed by the insertion of a picrate of silver and glycerine tampon, which remained in situ thirty-six hours.

At the end of two months the uterus was reduced to one-half its former size, and the induration had practically disappeared. Needless to say, the discharge also rapidly diminished until it ceased, while the patient's general health was markedly improved.

Another condition confronted by the gynecologist is tuberculosis of the peritoneum. This is due to an invasion of the peritoneal cavity by the tubercle bacilli. Tubercle nodules are scattered over the peritoneal surface of the uterus, and in some cases, even upon the adjacent peritoneum. In acute cases we have marked congestion, with shreds of lymph hanging from the inflamed surfaces. In this condition the peritoneum is greatly thickened, becomes redder, and the blood-vessels are congested.

Since in tubercular peritonitis we have the formation of tubercles containing tubercular lymph, the x-ray will be found most useful, since it will not only inhibit the growth and propagation of tubercle bacilli found in the peritoneal cavity and adnexa, but will cause a contraction of these tubercular nodules, and absorption of the toxins, which becomes an auto-toxin, and which raises the opsonic index.

For the treatment of such cases a high tube is employed, the writer believing the higher the better, and he preferably uses one which will "back-up" a nine-inch spark gap, using a 12 plate Van Houten and Tenbroeck machine, at a speed of 600 revolutions.

The patient is directed to remove all clothing which contains metal or bone parts, and the tube is placed fifteen inches from the abdomen, with the anode pointing toward the uterus.

If the case is an acute one, the writer has frequently given as long as a thirty minute treatment, but if the case is chronic, shorter ones, frequently repeated, have been found more efficacious.

Case 2. Miss —. Phthisis pulmonalis of eight years' standing. She developed intense pain in the pelvis, and while the morning temperature was normal that of the evening varied between 103 and 104. Night sweats were present, and the abdomen was found to be hot to the touch, the slightest movement causing intense pain.

Three treatments with the x-ray were given upon three

consecutive days, and entirely cured this case, the temperature, night sweats and pain disappearing after the first treatment. The patient has had three similar attacks during the past two years, each attack being cured in the same manner by this modality.

Oophoritis and salpingitis are pathological conditions which are very familiar to the gynecological surgeon. In acute oophoritis, the ovary is increased in size, becoming edematous, or filled with cysts. An inflammation of the ovary may progress to an abscess, or in the less severe forms, resolution may take place. The connective tissue retracts causing premature involution, or cirrhosis of the ovary.

The chronic form is more common. In this the ovary may be enlarged, having several cysts, with little interstitial growth or increase in the fibrous tissue of the organ. Subsequently atrophy occurs. Hysteria is usually a concomitant symptom, and sterility a usual result.

Salpingitis is closely allied to oophoritis, and presents as well the usual signs of inflammation. In addition we have vascular injection, transmigration of leucocytes, increase in round-celled infiltration, and the swelling of the epithelium. The mucosa is greatly thickened, both on account of the hypertrophy of the constituent cells, and because of the vascular construction of the villi. The secretion of the tube is at first fluid, and later mucoid, the color being transparent, milky or reddish.

From the beginning of the inflammation the secretion may be of a purulent character. From this stage on, the course and termination of the inflammation depend upon a number of conditions. If resolution does not take place in the acute stage, the condition is liable to become chronic.

When the acute stage becomes chronic, the involvement of the muscular portion of the tube takes place. Sharp twists and kinks occur in the tube, and it becomes less flexible than in the normal state. Sooner or later plastic lymph is thrown out about the tube, which forms adhesions with the adjacent viscera. In the course of the progress of the disease, the abdominal end of the tube may be narrowed, the secretions at first hemmed in, and later discharged into the pelvis, giving rise to pelvic peritonitis.

In the treatment of salpingitis and oophoritis, we have to

deal not only with engorgement and hypertrophy, but few cases come under our care which have not a number of adhesions, while most present a tubo- or tubo-ovarian mass. In these cases it is necessary to cause an absorption of the mass itself, and this can be readily done by means of the actino-therapeutic or other high candle power incandescent lamp.

The patient retires to a dressing room, disrobes, and dons a kimona which is in readiness. She then reclines upon a couch, the abdomen is bared, preferably from the symphysis to well above the umbilicus, and the lamp placed as close to the patient as possible without burning. It is advisable to move the lamp every four or five minutes, so that the bright spots may not always strike the same place, but these should always be about the ovarian region.

This treatment is continued from thirty to forty minutes, according to the severity of the case. The writer has found this technique preferable to the one usually employed, viz., keeping the light closer and in constant motion—as he believes that more of the therapeutic rays (call them by what name you will), will reach the deeper structures, by the former method, than by keeping the light in constant motion, thus suffering the majority of the rays to be absorbed by the constant circulation of blood in the capillaries. This treatment may be advantageously supplemented by that described under endometritis.

Case 3. Mrs. —, aged twenty-one, one miscarriage at three months, which occurred eleven months prior to the first examination. The writer discovered a tubo-ovarian mass on the right side, as large as a golf ball, and one upon the left equivalent in size to an English walnut. Numerous adhesions were present, and the organs were so tender that not until after the third treatment was thorough examination possible.

In addition to the symptoms already described, there was present a profuse vaginal discharge. The patient had previously consulted four physicians, and had attended three hospital clinics, the unanimous decision being that operation alone would benefit her. At one clinic immediate operation was urged to the point of insistence. The examinations to which she had submitted were so excessively painful, that upon several occasions she had fainted.

This patient was given a light treatment for forty-five

minutes twice a week, this being followed by tampon treatment, the latter necessitated by the leucorrhea. At the end of two months both tubo-ovarian masses had disappeared, and the tenderness as well. The patient has gained in weight, is no longer an invalid, but has become instead a useful member of society.

Ovarian cysts and hydromata are being reduced in many instances by the Morton wave, and in this connection the writer could cite a case.

Case 4. Mrs. —, aged thirty-six, the mother of four children. The uterus was found to be much enlarged and freely movable. Bimanual examination disclosed a large, smooth round mass, filling the entire left side of the pelvis, and extending as far as the umbilicus. This mass was also freely movable, and the diagnosis of a pedunculated cyst of the broad ligament was made.

The treatment given was as follows: in the vagina was placed as high as possible an insulated vaginal metal electrode, connected with the positive pole of a static machine. A pad was placed on the abdomen in the region over the tumor and grounded, while the negative pole was also grounded. The pole pieces were then pulled apart as far as the patient could comfortably endure, and the machine speeded until 150 disruptions per minute were reached. This treatment was given three times per week, with the result that the mass diminished in size each week, until at the end of six months it had disappeared.

It is interesting to note that sterility, which accompanied many of these diseased conditions, proved amenable to the modalities employed, and, in many instances, upon the restoration to a normal state, pregnancy ensued.

The writer may be accused of irrelevancy in introducing the preceding discussion into a paper on modern malpractice in gynecology. But is the operation of oophorectomy in any way related to malpractice? The state makes the destruction of a single fetus a criminal act, yet the destruction of the organs which make conception possible has absolutely no legal restraint. The artificial termination of a single conception is punishable by law, but it is legitimate to extirpate the reproductive organs without restriction. Is this logical?

Far be it from the writer to utter wholesale disparagement of the brilliant work of our gynecological surgeons. There are instances when an oophorectomy is absolutely necessary, just as when the life of the mother is at stake, the unborn child must be sacrificed. But the writer does desire to most earnestly protest against the ruthless removal of the ovaries, and would urge that the mutilating operation be the last resort.

A number of years ago, a boy was brought into a hospital having a fracture of the ulna, radius and humerus of one arm, and a clean, compound fracture of the other. Yet the surgeon in charge amputated both arms!

A patient who had suffered for some years with sciatica, last winter entered a hospital near New York for treatment. Failing to obtain relief after the usual methods of treatment had been applied, a resection of the leg at the hip joint was performed. Needless to say that the sciatica was not cured, as the lesion was doubtless at the sciatica notch.

Viewed in the light of modern conservatism, this would be termed criminal, yet ovaries have been removed for less cause.

Before it is possible to commit a person to an asylum, three physicians must attest his mental unsoundness. Should not the consent of at least two physicians be required before it is permissible to perform an operation which will result in absolute sterility?

Since physico-therapy has amply demonstrated its potency in the field of gynecology—since its modalities can restore to normal pathological conditions which are apparently hopeless, the writer would most earnestly plead that no patient be deprived of her ovaries until she has had opportunity to be treated by the proper modality, applied with discrimination. Then if her relief or cure be not accomplished operation may be necessary, but the writer is frank to say that such cases are few and far between.

In conclusion, it is desired to state that this paper is by no means offered as an exhaustive treatise on the application of physico-therapy to gynecology, but the writer's purpose has been to show what has been accomplished in a few cases by advanced therapeutics, in saving women from mutilating operations.

There are numerous other modalities which can be successfully employed, but the writer has merely endeavored to show what a single modality, used in accordance with modern methods of treatment has been able to accomplish, and if by his humble efforts a single woman can be saved from unsexing, those efforts will not have been in vain. May the day soon come when modern malpractice in gynecology shall give place to advanced therapeutics, and extirpation yield to regeneration.

ELECTRIC ANALGESIA IN LABORATORY SURGERY
SUCCESSFULLY APPLIED DURING A PERIOD OF
THREE YEARS. DEMONSTRATION ON AN ANI-
MAL, AND CLINICAL APPLICATION.

(From Dr. Magnan's Laboratory, Ste.-Anne Asylum, Paris, Directed
by Dr. Louise G. Robinovitch.)

BY LOUISE G. ROBINOVITCH, B. ès L., M.D.,

Paris; Member, New York Academy of Medicine; Member American
Medical Association; Foreign Associate Member, Medico-
Psychological Society, Paris.

In 1906 we were the first to apply electric analgesia in laboratory surgery and made our report about this application to the Jury of our thesis presented before the Faculty of Medicine, Professor Raymond presiding (1). We have continued up to date the substitution of electric analgesia for chloroform and ether in all our laboratory surgery. The method of application and the interrupter described in our thesis and in other papers has since been modified by us (2). The most important modification lies in the construction of the interrupter through which the electric current passes. We have been obliged to change every detail in the instrument directly connected with the interruption of the current in order to insure safety in the application of this form of analgesia and to exclude muscular rigidity that made it impossible to utilize the current for surgical purposes. The instrument is described in another paper entitled Motor-Interrupter Supplying a Current of Frequent Interruption for Electric Anesthesia.

Technique.—The direct current is led from the source into a potentiometer. The rheostat is a carbon rheostat; a wire rheostat causes troublesome inductive. The negative pole is connected with the interrupter, a milliampèremeter, a switch and a resistance box (Wheatstone bridge or any graded resistance). All these instruments are in series. A voltmeter is connected in shunt. The resistance used is between 300 and 500 Ohms; any other resistance would also answer the purpose. The bridge represents the patient or the animal.

Regulating the period of the passage of the current.—The period of the passage of the current is of utmost importance and is regulated as follows: the direct current is turned on, the voltmeter showing, say, 40 volts and the milliamperemeter 20 milliamperes, while the wheel interrupter is stationary and is put in a position to allow the passage of the current. Now, let the wheel turn and interrupt the current. Read the amperage: whatever the amperage is, it is your aim to obtain 1/10 period of the passage, 9/10 being lost. To do this, change the position of the movable lever of the wheel in relation to the fixed lever—until the meter shows 2 instead of 20 milliamperes. The period is now 1/10.*

This period may be regulated by means of the special lever in the interrupter, and is indicated on the graduated scale provided for that purpose above the wheel. But a correct graduation involves a great deal of time on the part of the instrument maker, so that this part alone of the apparatus would cost ten times more than does the whole interrupter with its motor. Instrument makers will declare that their graduation is perfect, but do not bother with that. Just take a tiny bit more trouble and regulate the period as indicated here,—by means of the milliamperemeter: The period is of utmost importance in this work.

The Experiment.—Reduce the voltage to zero with the potentialmeter; substitute the patient or animal for the resistance box and induce analgesia by guiding the voltage slowly and gradually—by means of the potentialmeter. Watch carefully the voltage and milliamperage.

Procedure.—The cathode is applied at the forehead and the anode at the lumbar region. The electrodes are made of zinc, covered not with chamois, but always covered with a thick layer of absorbent cotton wet with a salt solution 7 per 1,000.

For dogs of large size the cathode is 9 x 9 centimeters, the anode 12 x 25 centimeters. The electrodes are held in place by means of rubber bands or strings.

The continuous current is interrupted at the negative pole; we repeat that the cathode should be at the head (see our thesis cited above, on the danger of applying the anode at the head).

The circuit is closed at zero volts; the voltage is now turned on gradually by manipulating the contact lever of the poten-

tialmeter; while doing this the operator pays particular attention to the voltage and amperage. A dog can be anesthetized with from 5 to 10 volts, the milliamperage ranging between 1.5 to 2 m.a. The resistance of a dog is between 300 and 500 ohms, according to the animal and—the size of the electrodes used.

At the beginning of the passage of the current the animal is uneasy; as the current is being increased to 1 milliampere the animal becomes agitated and tries with its forepaws to dislodge the head electrode. The current is increased to 1.5 milliampere and the animal makes a supreme attempt to run away. The current is finally increased to 2 milliamperes. The animal falls on its side and remains quiet. There is evacuation of the bowels and emptying of the bladder; if there is milk in the breasts the milk spurts for a few seconds. The current is decreased again to some 1.7 or 1.5 milliamperes, according to requirements, and the animal is ready to be operated upon. If the analgesia is kept up for a long time, it is necessary to gradually decrease the voltage—the smallest fraction of a volt at a time; during such analgesia the animal keeps its eyes wide open and is apt to lift its head at various intervals, for a second or two; the animal may even make an effort to raise itself, but immediately falls back on its side and remains quiet again. Consciousness is not abolished; the cutaneous reflexes are considerably exaggerated; the sense of touch is blunted but not abolished. Sensibility to pain is markedly reduced but not completely abolished. Regardless of this, the dog, of all animals used in laboratory work the most sensitive to pain, stands well the most painful operations under this analgesia, such as exposing the carotid artery, the femoral artery, abdominal operations, etc. In our experience extending over a period of three years, we have not had any untoward accident attributable to this anesthesia. Immediately after the operation the animal walks about and shows no after effects, as you may see from the actions of the animal on which we have operated before you.

It should be borne in mind that electric analgesia causes abortion in pregnant animals; the abortion may take place on the same day or on the day following the electrization.

We repeat the caution we have presented in our paper on electric anesthesia, published in the *Reference Handbook of*

the Medical Sciences, Wood & Co., 1907: No physician should undertake to practice electric anesthesia on man without having had two years' daily experience in this work. Quite as much experience is necessary as in the art of administering ether or chloroform to patients—with perfect safety to their lives. It is not difficult to produce the anesthesia; on the contrary, everything connected with it is as simple as can be. But the proper manipulation of the voltage and amperage together with the correct understanding of the respiration and pulse of the subject in the circuit may be expected of none but of the physician who has had at least two years' daily experience in the work.

We feel a great responsibility in presenting the good results obtained in our work and for the following reason: an excellent colleague, a thorough electrician and surgeon became enthused with our work, repeated our experiments a few times, and considered himself sufficiently prepared to demonstrate the operation to a large gathering of professional men at one of the leading universities in Europe. The animal chosen was a rabbit; it was put into the circuit, the voltage turned on, and—electrocution—instead of anesthesia was the result.

Similar accidents have happened in the hands of the two surgeons in this country who attempted to repeat our application of this analgesia in surgical work. Dr. Brewer's and Dr. Tait's unfortunate accidents in this work while repeating our experiments of surgical application were caused by faulty technique and instrumentation as well as by undesirable electric sources. We explained this in our opening discussion of the subject at the meeting of the American Medical Association, held at Atlantic City, June, 1909.

Such results seem incomprehensible to us. When applied centrally 2 milliamperes represent an ample average of current that a dog can stand. In rare exceptions: 1 in 100—it may become necessary to use 3 milliamperes to produce analgesia. In ordinary cases it is useless to administer more than 2 milliamperes because muscular rigidity is caused with currents above this intensity. Besides, it is dangerous to use an amperage above the one required for analgesia because cardiac and respiratory disturbance is immediately induced. The disturbance disappears, of course, if the excessive current is immediately reduced. We have presented in our thesis and in all

our papers on this subject the possible dangers that should be avoided. Yet the animal was electrocuted—when it was most desired only to anesthetize it. The potential used—by mistake—was some 70 volts—instead of 5 to 8 volts. In case of a man the mishap would have been most serious. Had our colleague been familiar with the normal respiration and pulse of a rabbit in the circuit of a current intended for anesthesia, he would have recognized his mistake at once; he would have turned off the current immediately, and no harm would have been done, except for a momentary electric shock with some 70 volts—that is never of any importance—if it lasts only a second or two. But such a current is dangerous if left to course through a living animal indefinitely. We have repeatedly demonstrated the impossibility,—in our hands,—of even shocking the animal during electric anesthesia; with the animal in the circuit, we have shown repeatedly that after the analgesic dose has been reached, with 5 or 10 volts, the slightest increase of this dose, even to the extent of a fraction of a volt, excites the animal; the experienced operator utilizes this peculiarity as a guide in the increase or decrease of the potential. The only way in which an operator can succeed in killing an animal during electric analgesia is for him to disregard the animal's agitation while he increases the voltage, then to disregard the animal's convulsions as he still continues to increase the voltage twice, five and ten times the normal dose—until electrocution takes place. Such a thing seems preposterous, and yet it has been done by surgeons. It is not superfluous, therefore, for us to repeat, that no physician should attempt to practice this analgesia on man, unless this physician has had two years' daily experience in this work on animals.

To avoid all possible accidental shock, the physician should know that the voltage and amperage necessary to induce analgesia is quite limited in range; the resistance of man and dog,—when electrodes of dimensions indicated by us are used,—is about 300 ohms. In dogs, from 5 to 10 volts, showing from 1.5 to 2 milliamperes, causes anesthesia. The resistance varies in animals; but it does not vary so much that it should become necessary to use a current strong enough to electrocute the subject. Electrocution, or causing convulsions, under these circumstances, is the result of some grave mistake; a man who commits such a mistake, on animals should put in two years in

daily practice of this work, before attempting such analgesia on man.

One more word of caution: before attempting the practice of electric anesthesia on man, the physician should be thoroughly familiar with our method of resuscitation. In the hands of a practiced operator an accidental electrocution (although unpardonable) as is the one related, is of no importance, because a slight shock of short duration is not dangerous if resuscitation is immediately attempted. We have experimentally repeated our colleague's mishap—shocking the animal to death—as he had done accidentally, and bringing it back to life—as he had not done. We have never lost an animal in this series of experiments.

While urging the necessity of caution, we have no hesitation in recommending electric analgesia as an excellent substitute for ether and chloroform.

Contra-Indication.—Centrally, electric analgesia should not be applied in the old, in subjects affected with arterio-sclerosis or in patients subject to epileptic, apoplectiform or apoplectic attacks. The effects of the current is to heighten the blood pressure.

The duration of electric analgesia may be prolonged for many hours without any danger to the patient. In our thesis already cited we present an experiment in which an animal was kept under the influence of this analgesia for a period of eight hours and twenty minutes. The temperature remained normal. The respiration and pulse were normal or perhaps a trifle ampler and slower than normal during the whole period.

Central analgesia in man may be produced with from 37 to 40 or more volts and 4 milliamperes of the current described (thesis, p. 24). In the hands of a practiced physiologist thoroughly familiar with the respiration and blood pressure of the subject in the circuit there is perfect safety in the operation.

Local Analgesia.—In 1906 we practiced local analgesia of our own arm, using 25 volts; the amperage was not recorded, but is generally between 1.5 and 4 milliamperes.

It is much easier to produce analgesia of the lower extremities than it is to produce it in the arm or forearm; because the anterior crural nerve is much more accessible than are the large nerve trunks of the upper limb.

Importance of Appropriate Electric Sources for Causing Electric Analgesia.—We have indicated in our previous publications the importance of using appropriate electric sources for analgesia. Since 1905 our personal experience has taught us that it is dangerous to use the city current (thesis, pp. 17, 18. While we were in Rome, Italy, in 1905, we were scheduled to present our experiments on electric sleep before the International Congress of Psychology. The city current in Rome is not a direct but an alternating current, so that it became necessary to use storage batteries. The electric sleep obtained with this current was far superior to that obtained in France with the city current. At first it was our impression that the Roman rabbit was more susceptible to this sleep than were the French rabbits; we wrote to the Professors above named that this was our impression. But on returning to their laboratories, in France, we resumed our work with the city current: the electric sleep was inferior to that obtained by us in Rome with a current from a storage battery. We then used a current from storage batteries and it was a great surprise to see a quieter and more marked sleep follow than was that obtained with the city current. It was now evident that the cause of superiority was due not to racial traits of the respective rabbits but to the difference between the two currents. The matter was now a simple one: the current obtained from a storage battery that is used for no other purpose is far more even than a city current; the latter is always disturbed by running dynamos or lighting of lamps. The storage battery current is like a smooth, quiet lake; while the city current is like a turbulent sea—for the purpose of electric analgesia.

We have established the fact, therefore, that storage batteries should be used for the supply of the continuous current.

Clinical Application.—The first patient was a chronic alcoholic, who had been treated at the Ste-Anne Asylum, Paris, several times during the last twenty years. For the last ten years he has been suffering from left hemianesthesia with marked blunting of the sense of taste and smell, abolition of the sense of touch, heat and pain.

The patient was subjected to electric currents of from 6,000 to 12,000 interruptions per minute, period of passage of the current $1/10$, from 20 to 30 volts; cathode, 25 x 30 centimeters,

at the dorsal region; anode, 12 x 25 centimeters, at the lumbar region. Duration of application, 30 minutes, every day during four weeks.

Result: disappearance of all the disturbances, as well as that of articular pains of ten years' duration, anode, 10 x 15 centimeters was also applied to the joints.

The second patient was treated similarly for right hemianesthesia of one year's duration; the patient had previously been treated by a leading specialist with the ordinary electric currents and massage, but no improvement resulted. Our treatment was kept up for four weeks. The patient made a complete recovery.

We do not undertake to explain the process by which the cure has been established; suggestion certainly played no part in the case of the chronic alcoholic; he objected to the treatment most energetically—before each sitting. The salient effect of this electric current is that of changing the blood pressure, as is shown in all our contributions to this study (see our thesis mentioned above). Does the heightened blood pressure account for a nutritive change? This is a question for consideration.

On this patient we practiced rhythmic excitations such as one should use for purposes of resuscitation; from 20 to 90 volts were used for the excitations. The patient enjoyed the shocks and laughed as these were practiced. Hence, in cases of apparent death it is not dangerous to use such voltage.

NOTE: Electric analgesia should not be combined with any other form of anesthesia. In our laboratory operations performed under electric analgesia, preparatory to administering chloroform to the same animal, we found that the animal was profoundly agitated by the chloroform given while the electric current was kept up. The reason of this excessive agitation is a matter for physiologic study.

We have tried, at Dr. Gwathmey's suggestion, a combination of morphinization and electric analgesia. Dr. James Taylor Gwathmey, of New York, who has contributed so much valuable work to the physiology of anesthesia, thought it would be practical to minimize the use of morphine by combining this with electric anesthesia. We found that it was impossible to combine morphinism with electric analgesia: a dog fully morphinized was excited and agitated when an electric

current used for analgesia was passed through its body with the head in the circuit. The maximum potential that the animal could stand without discomfort was one volt; this animal that lay in a stupor caused by morphine was excited with one volt of the current and jumped off the table. The same animal was submitted to electric analgesia when in its normal condition—on the previous day: the dose used was 9 to 10 volts, registering from 1.5 to 2 milliamperes.

Electric Sleep.—In clinical work we distinguish between electric "sleep" and "analgesia." Patients suffering from insomnia are subjected to electric "sleep" as follows: the negative electrode is shaped to the forehead; the positive electrode is applied to the palm of the *right* hand. The current is turned on very slowly; some five minutes are spent in turning or not over three-quarters of a milliampere of current. The patient generally falls asleep a few minutes after the current is turned on. The current is allowed to course through the patient for about one hour. His respiration is watched carefully all the time. The patient sleeps while the current is on. The current is now turned off, but the patient keeps on sleeping. When he wakes up, he generally remarks that he feels "a bit chilly" (these experiments were made in the winter time). This feeling of cold passes off within one or two minutes.

The "chilly" feeling is due, no doubt, to vaso-constriction during the passage of the current, as is shown in the manometric traces in our thesis cited above, pp. 49 to 52.

On the basis of these experiments we believe that in normal sleep there is also vaso-constriction.

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* Since the presentation of our last model of interrupter, a leading New York firm has constructed, under our direction, a motor-interrupter with a fixed period of the passage of the current.

THE PHYSIOLOGICAL ACTIONS OF RADIANT ENERGY AND THE STATIC CURRENT AND THEIR INDICATION IN THE TREATMENT OF INEBRIETY AND DRUG NARCOSIS.*

BY WILLIAM BENHAM SNOW, M.D., NEW YORK.

The province of my subject includes the physical but not the psychic conditions of inebriety and narcotism. It is important, however, to recognize the intimate relation that exists between the ego and its habitat.

The mental state as well as the nervous mechanism requires a healthy condition of the body functions, particularly of those related to metabolism, in order that an equilibrium may be maintained or restored—*mens sana in corpore sana*. To consider, therefore, either of the correlated sides of this important problem without recognizing the intimate relationship existing between them is to fall short of the adequate consideration of the subject.

Environment and immoral influences may lead the normal youth into indulgences which gradually pervert both the mental and physical characteristics of the man; and other habits and excesses may lower the body resistance and vitality, after which the victim more readily falls a prey to further vicious habits.

Pain is probably the most common cause which leads the individual to become a victim of narcotism, which may speedily lead him into subjection to a habit which perverts his moral as well as his physical status. Both the cause and effect are to be considered in the treatment if these unfortunates are to be redeemed. Whenever an individual becomes a slave to the alcohol or opium habit, the physician who undertakes to cure him must investigate the personal equation, consider everything that has led up to the condition present, and be prepared to meet each phase of the case. The clinician will recognize a symptom complex, which in various cases presents different problems if normal mental and physical poise are to be restored.

The prognosis, as in all abnormal conditions, generally bears

* Read before the American Society for the Study of Alcohol and Other Narcotics, at the Hotel Belvedere, Baltimore, Md., April 20, 1911.

a well marked relation to the chronicity or time during which the process has been active, and also to the extent of disturbance that has been produced in the important functions of the organism.

The alcoholic usually suffers from gastritis and intestinal derangements associated with auto-intoxication, and exhibits a series of symptoms pointing in many cases to hypertension and arteriosclerosis. In some instances cirrhosis of the liver will complicate the alimentary derangements. In all cases the secretions will be inactive, with a generally disturbed and impaired metabolism, and systemic poisoning due not only to interference with nutrition and auto-intoxication arising from impaired digestion, but also to a systemic vitiated condition arising from the slow poisoning process of chronic alcoholism.

In narcotism likewise derangements of the alimentary canal are present, which arise from interference with the activity of all the body functions due to inhibition of peristalsis and secretion.

It can be readily appreciated, and is generally recognized, that drug medication plays a very unsatisfactory part in relieving conditions of perverted and impaired metabolism. While exercise and healthy environment constitute very important agencies in the restoration of metabolism, they are quite inadequate to meet the extremes of conditions as they exist in advanced cases of inebriety and narcotism.

The measures which I am requested to consider as useful in the management of these cases probably will play fully as important, if not the most important, roles when employed for the indicated reestablishment of active metabolism. The types of energy which comprise emanations from sources of radiant light and heat, and the static currents possess valuable properties, each operating in its own way to awaken the tissues to their normal activities.

That these valuable agencies have been seriously neglected in therapeutics the modern text books bear testimony. That they deserve most earnest study and prompt recognition is patent to all who are at all familiar with their *modus operandi* when intelligently employed.

In considering the physiological phenomena, we must look upon radiant energy as including both the effects of light and

the effects of heat. Emanating from luminous sources, such as the sun, the incandescent lamp, or the arc lamp, light and heat are manifestly ether vibrations, and bodies which resist their passage to the extent of converting light vibrations into heat units are evidently acted upon by their complex influences.

Radiant energy from these sources penetrates the human body, except of the dark skinned races, to a distance of approximately six inches, as estimated or demonstrated by Kellogg, and probably the infra-red or heat rays penetrate deeper. Even the presence of the bony structure does not prevent these vibrations from reaching and affecting every organ in the body, as is readily shown by illuminating the antrum with a small lamp in the mouth. The penetration of radiant energy increases directly as the wave length and inversely as the frequency of the vibration—the higher the frequency the shorter the wave length. The greater the wave length, the greater the penetration; and as the wave length diminishes from the infra-red to the ultra-violet, the greater heat production in the tissues is derived from the lower frequencies of the spectrum. It must be understood, furthermore, that with the increased penetration and transformation into heat in any tissue there is an increased influx of blood and cell activity because of the automatic effort, through vaso-motor influences, to maintain an equalization of temperature throughout the organism.

The primary results realized from the heat effects of radiant energy are (1) *local hyperemia* in the parts treated, and (2) *consequent increase of nutrition, metabolism, and phagocytosis* of the parts so stimulated.

That hyperemia is confined to the skin when convective heat, or heat applied from other than radiant sources is employed, was demonstrated by Dr. Gilman Thompson in his experiments upon an anesthetized cat. Hence radiant light and heat affect tissue metabolism to a greater depth than the Turkish or steam bath.

With the penetration and transformation of heat throughout the organism, there is a marked increase of elimination both at the periphery and through the glandular structures which are so stimulated, as well as of all glands through which a heated blood stream flows.

The application of radiant light and heat over the abdominal

cavity arouses to activity the dormant functions of the intestinal structures and other interior organs to a greater degree than the application of any other agent known to therapeutics, excepting possibly the static current, and this without harmful effects.

With the induction of perspiration, which in the light bath is very profuse, there is, through the increased activity of the sweat glands, a coincident elimination of the products of vicious metabolism and other irritants present in the blood. Radiant light, acting upon the blood in the skin rendered hyperemic by the administration, acts also to increase the oxidizing function and hemoglobin of the blood, dispersing thereby a double influence throughout the organism, as is demonstrated clinically in the treatment of all conditions of impaired metabolism. When used with sufficient intelligence to insure the employment of the proper degree of energy, no other agent is so active in restoring the functions of metabolism as systematically applied radiant light and heat.

Probably no other useful therapeutic agent has been more maligned and misunderstood by the profession than the electro-static current. Those who have not kept pace with the development of electro-therapeutics have expected from electric energy some mysterious unexplainable effect akin to the mystic. Consideration of the static current from this point of view is to-day both irrational and unscientific. When a proper investigation is made by skeptics, recognition of a great truth will certainly follow a comprehension of the authenticated effects of this important agent. A change is always promptly observed in the personal attitude of the originally incredulous physician who with open and inquiring mind studies the static current.

An erroneous view that static electricity only acts upon the surface of the body has been dominant in the minds of those unfamiliar with that current since that misconception was unwittingly promulgated by an eminent neurologist. It can be excused only on the score of unfamiliarity with the physics of the subject; for no other agent can be made to arouse to such energetic activity the remote recesses of the human body as can the static current. Its action is not necessarily electrolytic, but mechanical; and as a mechanical force it is intelligently employed.

Of the various methods for its application, the static wave current and the static sparks are the most valuable for arousing to activity conditions of sluggish metabolism. Applied to an indurated tissue with a metal electrode, employing a proper degree of energy as determined by experience in arranging the condenser conditions and by the length of the spark gap, this current is capable of softening throughout their substance, and bringing to their normal proportions, parts of the organism that have not undergone structural change, such as the development of hyperplasia. When applied to a hypertrophied cirrhotic liver, or to an enlarged spleen, extending into the abdominal cavity, the organ is made to retreat toward or even to its normal dimensions, as will a congested prostate gland, a sprained ankle, or a knee joint the seat of synovitis. Another result of the use of this current is its effect upon general metabolism, due to its passage to and fro through the tissues with each alternating charge and discharge.

Electricity can no longer be looked upon as other than a material substance. The experiments and demonstrations of Silvanus P. Thompson demonstrated this truth when an atom of hydrogen was resolved into upwards of eight hundred electrons. These minute particles, surging throughout the economy, arouse to activity the remote recesses of the body, increasing metabolism and thereby promoting the elimination of effete accumulations from within the tissues.

But of all the effects of this current, the most important is a local pulsatory activity induced in the tissues (graphically described as molecular gymnastics) by forcible alternating contraction and release, which, regulated by properly controlled generator speed and length of spark gap, are caused to succeed each other rapidly throughout the entire abdominal cavity, draining indurated tissue and expressing the infiltrate from the hardened mass. At the same time muscular spasm is relieved wherever present.

Let me not fail to impress, as strongly as I may, the fact that no agents, singly nor in combination, are so energetic in relieving the symptoms complex present in all cases of impaired metabolism as are radiant light and heat and the static currents. They are also peculiarly energetic in the relief of local inflammation and the consequent pain so often

the incentive to narcotism; also, occasionally, of alcoholism. The static current, by acting upon indurated tissue and muscular spasm as present in the noninfected types of inflammation, relieves induration and pressure, and this relief is followed by the prompt disappearance of pain. This applies not only to the treatment of external conditions, such as neuritis, but also to internal pelvic congestions or local inflammation wherever it may be found.

The treatment of narcotism should be anticipated by the employment of measures which relieve the pain which may have led up to the habit, and no agent is more effective than the static current in effecting such relief in the class of cases referred to.

Where inflammation has been caused by *infection*, hyperemia as induced by radiant light and heat and the d'Arsonval currents (agents which produce heat and thereby induce hyperemia in the involved tissues) is capable of increasing local tissue resistance and phagocytosis, thereby often relieving early cases of infectious inflammation, and is valuable in all cases.

You will pardon the assurance with which I make these statements. They are based upon an intelligent use of these agencies by the writer for more than a decade. If I am to judge from the general consensus of medical opinion, probably few of the profession are familiar with the results here briefly outlined, which experience has demonstrated to be valuable. Dr. Crothers, through whose courtesy I present this paper, is himself well aware of the phenomena which attends the employment of these potent and often maligned agents. The use of them has become convenient and universally accessible through the recent developments of the more powerful influence machine for generating static currents, and through the development of electric lamps of high candle power.

In closing I appeal to your intelligence and to your fair-mindedness, and earnestly urge that a more liberal and general attention be given to the well attested effects of these important therapeutic measures.

329 West Fifty-seventh Street.

Progress in Physical Therapeutics.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M.D., DENVER, COLO.

The Action of the X-Rays on the Dog's Testicle. (Journal of the American Medical Association, July 1, 1911.)

"According to the recent writings of Nogier and Regaud, also Simmonds, the X-rays have an action on the dog's testicle quite similar to that observed in other mammals. Besides the seminal cells, which disappear under the action of the rays, oviform cells are encountered in the dog which are refractory to irradiation; these cells, however, are not the starting point of reproduction of the epithelium which has disappeared. Although the dog's testicle is quite large, it is quite possible to obtain complete and permanent sterilization, but this result appears impossible to attain in a single seance, unless a radio-dermatitis is produced. The latter complication can be avoided, however, by passing the rays through a sheet of aluminum 2 or 3 mm. thick in the case of a large animal. Under these circumstances complete and permanent sterilization can be obtained in two seances four weeks apart, the amount of rays being measured by tint No. 4 of Bordier's chromoradiometer.

"Simmonds points out that there is a cessation of spermatogenesis either diffuse or in foci, but a return to the normal state can take place. The canaliculi remain intact if the action of the rays is short. When prolonged a fatty orchitis results and not the fibrous type.

Anemia from Epinephrin in Roentgen Ray Work. (Journal of the American Medical Association, July 22, 1911.)

Reicher and Lenze state it is possible, by expelling blood from the region with adrenalin, to nearly double the dose of the rays without injury. This technique is especially adapted for deep subcutaneous cancers. They inject the adrenalin sol. at several points over the area to be treated, and follow with the exposure at once. The exposures can be repeated the second and third day, and again after a pause of fourteen or eighteen days.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

Hot Baths in Whooping Cough.

A prominent German doctor, according to the *Trained Nurse*, advocates the use of hot baths given toward evening in cases of whooping cough. The method recommended is as follows:

The water should be about 99° F., and the child should stay in the bath from ten to fifteen minutes, the head being kept cool with a cold water compress. The children sleep well after it, and the number and severity of the paroxysms seem much diminished. Attention is called to the skin of children thus afflicted, which, it is said, is usually pale and cool, indicating contraction of the vessels in the skin. The hot bath counteracts this and thus relieves the internal organs, promotes elimination of toxins, and soothes the nervous system and the tendency to the paroxysms.

Hot Dip Baths. (Determann, Medizinische Klinik, Berlin, June 4. vii—xxiii.)

Determann is loud in his praises of what he calls hot dip baths (*heisse tauch baeder*), stating that a great advantage, outside of the beneficial effects to be derived from the bath itself, lies in the fact that often the weakest patients can take these brief hot dips or tub baths which do not in any sense of the word exercise them, while it produces a vigorous reaction. The technique employed by the writer is that of a hot full bath at a temperature of 37° to 45° C. (98.6° to 133° F.); the duration of the bath is from four to ten seconds, emersion of the body taking place by either the patient lying down in the bath himself or being lowered in the water by two attendants. The duration of the bath is so short that the body does not become overheated, nor is there any of the lassitude that follows a too great accumulation of heat from the longer duration of the thorough hot bath treatment.

He speaks especially in favor of these hot dip baths where there is great prostration, general motor weakness, and great sensory irritability. The indications are made by the short dip, after which the patient is wrapped in blankets and lies quietly for an hour. Where the physician does not care to give the full hot bath, partial hot dip baths may be employed. Of course, the hydrotherapist in the employment of these baths must, as in everything else in life, exercise his discretion and realize that they are to be employed only in cases that are free from organic diseases, and not in those upon whom too much of a strain cannot be placed.

Therapy of Heat and Cold. (*Medical Era*, December, 1910.)

The cold pack for an acute laryngitis or tonsillitis, maintained for an hour or for two or three hours, according to the results obtained, often proves very helpful in checking the inflammation and in giving comfort to the patient. In some cases the cold is not well tolerated, especially in young children, and the use of a hot pack gives very good results without the previous employment of cold, although, where it can be done, the cold should precede the heat for a short time.

An objection to the use of either the hot or cold wet pack to the throat of a child is that it may tend to chill the surface as soon as the first effect is gone; also, that the clothing gets damp, and the child is in danger of "taking cold" from the use of the water.

While the danger from this latter source is greatly overestimated, it is still a fact that in the hands of the untrained attendant it is a real objection; but even under these conditions the application of the heat or cold may still be made by using a rubber water bag, which offers a solution of this problem. It may contain either hot or cold water, and any temperature short of boiling water may be secured.

MECHANICAL VIBRATION-THERAPY.

EDITED BY FREDERICK H. MORSE, M.D.

Treatment of Flat Foot by Mechanical Vibration and Strapping.

The human foot is in its normal condition capable of great flexibility of motion. It may be compared to a ship's mast which is held in position by ropes and braces from either side, and if from any reason the supports become damaged from any cause, something gives away somewhere and the whole structure may be seriously impaired. The treatment of the more or less dislocated mast is to restore it to position and condition as quickly as possible by the usual methods of repair in such cases, before the joints and parts are beyond recall. So it is with the foot, which is much more intricate in its network of tendons, lines, and braces; yet the principle of restoration of normal functions is the same.

One has only to glance at a correct anatomical picture of the muscles of the bottom of the foot and the peculiar functions of the tibialis anticus, soleus, flexor, longus digitorum,

peroneus longus, flexor brevis, policis, and several others to see that any considerable distortion of them about those hard, bony surfaces must sooner or later bring about degenerative changes that threaten local permanent disability, whatever may have been the cause. All attempts to produce a cure are usually futile by the common methods with metallic arch supporter so greatly extolled by the instrument maker and regularly prescribed in an offhand manner by the physician.

It is a well known physiological law that just in proportion as muscular fibre is caused or allowed to remain to any extent inactive there will be more or less inertia, degeneration, and paralysis, according to circumstances of individual cases. As it is with constipation, the more the usual drug medication is used, which merely softens or liquefies the bowel contents to the extent that the normal peristalsis is not needed, so much more the inertia increases, preventing a possibility of cure; so it is by wrong fitting shoes with hard strokes or otherwise improper pressure on the foot, causing impairment of muscular structure upon dependent parts and consequent stretching of tissues, with inflammation and pain extending into adjacent and remote parts. A so-called well fitting arch supporter may, and usually does, give relief of symptoms just as a splint will help a sprained ankle.

The treatment of the deformity, caused by traumatism, and known as flat foot or broken arch, is to both support the arch and correct the deformity. Therefore, any treatment would be incomplete which does not restore the tone of the tissues involved for restoration of a normal arch.

Much has been written about the importance of exercise as the great factor in restoring lost muscular tone, whatever part of the anatomy was deficient, either from a general sickness or from injury of the part.

Various styles of shoes have been exploited as the only correct shape, most of them having a steel shank built into the shoe, which is absolutely wrong. Some a semi-flexible and others an absolutely flexible shank; the latter is the most desirable, other conditions being equal, as the necessary exercise is being maintained. Much might be said about the true indications for successful treatment of a foot distorted and to an extent degenerated, which, unless in old or constitutionally

infected persons, is not necessarily desired but functionally disturbed, and is capable of restoration under proper care.

My experience, based on the treatment of many cases by the static wave current, high frequency, and mechanical vibration, combined with strapping in a manner to relieve the strain of the special muscles affected, has been very satisfactory, hence the excuse for the article. Presuming that one was to treat his case only with vibration and strapping, I would suggest a technique somewhat like this: Have the leg lie at first on a firm surface like a solid vibrating table, the body relaxed and at ease, with a pad or support under the ankle so that the vibratory impulse may have its full effect. The vibration then may be carried out by gentle pressure of not over ten seconds' time covering the areas especially affected front and back, also having some firm support under the part being treated; this should be carefully observed while treating the bottom of the foot.

The tibialis anticus, tibialis posticus, flexor longus policis, flexor longus digitorum, and the soleus muscles are the ones most commonly involved and should receive marked attention, both in the vibratory part of the treatment and the strapping. Of course, the more acute the case is, the greater care must be used in manipulation and application of the zinc oxide adhesive plaster along the course of the muscles in such a manner that relief is afforded at once. The operation, including the application of new strips of plaster, should be done once or twice weekly, until the foot will maintain the support of the body with comfort, and wear shoes that will give the foot plenty of freedom.

PHOTOTHERAPY.

EDITED BY HERBERT F. PITCHER, M.D.

The Kromayer Lamp in Skin Affections. (Archives d'Electricité Medicale.)

The U-shape of the Kromayer lamp and the lack of heat permit intense radiation of actinic rays to be applied to small surfaces. Nogier uses it in the treatment of lupus with excellent results. He makes applications every two or three days for fifteen or twenty minutes at a time.

In cases of naevus the lamp should be held in position for a longer time—twenty or thirty minutes. He claims that a cure results after half a dozen applications.

In alopecia areata the radiations from the lamp are made at a distance, with short repeated seances.

The results from this treatment Nogier states to be very satisfactory. He had also had considerable success with the Kromayer lamp in cases of seborrhœic eczema and acne.

The Sterilization of Potable Waters by the Ultra-Violet Rays.
(*The Lancet.* J. B. Thresh, M.D., and J. F. Beale, M.R.C.S.)

The authors go on to say that during recent years many attempts have been made to improve the old, and where properly condensed excellent system of purification. Most of these means have been failures, but three remain which may play an important part in the purification of water in the future. These are sterilization by means of (a) ozone, (b) chlorine, (c) ultra-violet rays of light. The authors state reasons why the ultra-violet rays are advantageous over the former two methods.

Where electricity is available an ultra-violet ray installation of a very simple character, requiring very little supervision, can be laid down, and this process can be used for purifying the supply of a single house as well as for the purification of the supply to the largest city. It has long been known that the invisible or ultra-violet rays of the solar spectrum are capable of producing marked chemical changes, and recent experiments have shown that rays of a certain wave length are much more powerful than those of shorter wave lengths. The rays emitted by the Cooper-Hewitt mercury vapor lamp are found to be particularly rich in these actinic rays, and in 1906 Nogier and Thirennot demonstrated that the rays of this lamp exerted a marked bactericidal action. Nogier conceived the idea that the lamp might be utilized for the sterilization of water. Since glass absorbs the specially active rays, fused silica has been substituted for it. Nogier immerses the lamp in the water to be sterilized, but other forms of apparatus are made in which the water does not come in contact with the lamp.

The Nogier lamp has been severely tested in France. Miguel's experiments showed that in clear and bright water many bacteria were killed after from 5 to 20 seconds' exposure to the ultra-violet rays, and that the most resistant spore-bearing bacteria were destroyed in from 30 to 60 seconds. The *bacillus coli* were killed in from 15 to 20 seconds; the

bacillus typhosus in from 10 to 20 seconds; the *cholera vibrio* in from 10 to 15 seconds, etc.

The experimental results thus far obtained are so encouraging that experiments on a much larger scale are about to be commenced. There is little doubt that for small installations and for suitable waters, when electrical currents are available, treatment with the ultra-violet rays will be more economical than any other process yet devised.

Potable waters can be practically sterilized and rendered safe at the cost of much less than a penny per 1000 gallons.

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERIC DE KRAFT, M.D.

Success or Failure in Electro-Therapy: A Consideration of Some of the Causes. (By Samuel Sloan, M.D., Glasgow. *Lancet*, London, July 1, 1911.)

The most important point in each case is a correct diagnosis. By this he means not the name of the disease alone, but why the patient is ill, what prevents him from getting well, what if any cause is still in operation. Many failures in electro-therapy are due to neglect in the diagnosis, not of the disease, but of the cause.

Headache may be of toxic or ocular origin. If toxic, of septic origin, tonsillar, intestinal, urethral, or uterine, the removal of the cause will simplify the electrical treatment.

In insomnia the cause may be idleness, alcohol, emotional excess, or undue nerve strain. Remove the cause, and if sound sleep does not follow we have an assured means for its cure in faradization of the brain or by auto-condensation.

Failure in electro-therapeutic treatment may be due to beginning treatment before the patient is ready for it.

Some preliminary treatment is usually needed, or the patient may be too weak, or his work too strenuous, or the effort of coming for it would involve an amount of fatigue which might not only prevent it from helping, but even make it capable of doing injury.

In alcoholic cases total abstinence should be enjoined if the treatment is to be successful. With these preliminaries, a course of electro-therapy may be begun with reasonable expectation of success. "Even in serious organic diseases, where cure is impossible," life may be prolonged by judicious electric treatment.

A case of malignant disease of the colon was so much benefited by dorso-abdominal faradization as to lead to the belief that there had been an error in diagnosis.

In peripheral neuritis general electric treatment is of small avail, but the vacuum electrode rubbed over the tender parts till distinct redness ensues will often cause the painful condition to disappear.

Failure in cases of so-called rheumatic neuritis may result because the spinal root of the nerve supplying the part is untreated.

"Excellent results may be obtained from fairly vigorous effleuve from the high frequency solenoid applied over the whole of the spine, strong enough to be just short of sparking and for fifteen minutes, for pains in the lower limbs and nocturnal fidgets which sometimes render sleep impossible."

A case of spastic paraplegia, with exaggerated knee reflexes and marked ankle clonus, was arrested by the daily application of the effleuve to the entire length of the spine for fifteen minutes. The reflexes are now almost normal and the ankle clonus has practically disappeared. A case of paraplegia in a woman, lasting nine years, was completely cured.

An hour or two of quiet rest before and after treatment is indispensable, especially when employing auto-condensation. Proper dosage is of every importance.

If the blood pressure is low or if the patient has been active in the morning, 100 milliamperes is enough for an initial treatment. As the strength improves, if no fatigue follows the treatment, a gradual increase in current strength is permissible. Fifteen minutes is the usual duration of a treatment.

The effleuve over the abdomen acts well in gastro-intestinal trouble and to the spine behind the arch of the aorta in cardiac dilatation.

Sloan has generally failed in diabetes and obesity with high frequency currents. Simple glycosuria, however, can be made to disappear. A lady who suffered from rheumatoid arthritis was materially benefited in twelve treatments. She was stronger, had less pain and less stiffness in joints. A year later she called to express her gratitude for the relief afforded.

In severe gastric dilatation, if there is no pyloric obstruction success is reasonably certain to follow the oroepigastric bipolar application of the high frequency current. He says: "Possibly the static induced current might be as efficient."

It is unwise to give intra-uterine high frequency applications since pelvic cellulitis has resulted therefrom. However, the mere passing of a uterine sound might do the same.

In cases of pyloric neurasthenia of women, minute ulcers and other irritable conditions may sometimes be found. Under proper electric treatment these can be made to disappear, with the result of removal of physical distress and mental anxiety and restoration of normal conjugal life.

The best results will be obtained by utilizing to the full all the resources of the healing art—electrical, medicinal, dietetic, physical, psychic.

He is the best physician who has his quiver full of weapons, and who, in cases of difficulty, is fertile in resource.

Two Cases of Prostatic Hypertrophy Successfully Treated with the X-Ray and High Frequency Currents. (By Sinclair Tousey, M.D., New York State Journal of Medicine, June, 1911.)

He applies the X-ray to the perineum through a cylinder three to five inches in diameter, which limits the field of exposure and protects the scrotum. The X-ray is passed through a screen of sole leather, which absorbs the rays which would be absorbed by the skin and produce dermatitis with little or no influence upon the deeper structures.

"The application of high frequency currents was an external one through a glass vacuum electrode applied over the perineum and later over the hypogastrium."

Case 1 had difficulty in micturition for ten or twelve years, some retention, hardly any pain, but a numb feeling at the neck of the bladder; had to rise twelve to fourteen times each night. Treatments were given three times a week from March 25 to May 31, 1911. By April 8 micturition three to four times a night, and by April 27 only two to three times a night. Dec. 1, 1910, no return of trouble.

Case 2. A man of 73 had enlargement of middle lobe of prostate. Had used a catheter every morning and had been advised to have an operation. Residual urine, four ounces. "A complete dose of X-ray was applied June 22, 24, 28, 1910." Nov. 9, 1910, the patient reports great improvement; he no longer used a catheter. There was less frequency in micturition. Residual urine, four ounces. A second course of treatment was given three times a week from Nov. 14 to Dec. 5, 1911. He was now able to go to bed at 11 p.m. and rise at 7 a.m. without having to urinate meantime.

THERMOTHERAPY.

EDITED BY THE EDITOR.

The Treatment of Neuritis with the Hot-Air Douche. (By Leopold Stieglitz, M.D., New York. New York Medical Record, July 8, 1911.)

The writer of this paper from his scope of investigation limits the principles of cure to two things, rest and heat,

contending that in the severe cases no headway will be made until the patient is put to bed and kept there until he is well on the way to recovery, afterwards returning to active life very gradually. The writer states that the beneficial effect of rest is indirect, because it protects the inflamed nerve trunk from innumerable small traumatisms, which would otherwise result from the active use of the limb. He observes that although rest is a *sine qua non* in severe cases, rest alone will not cure this form of neuritis, stating that there is very slight tendency towards spontaneous recovery of an inflamed nerve trunk. This failure to heal of its own accord is accounted for by the poor blood supply provided for the nutrition of the peripheral nerve trunks, and in general it may be said that the more poorly tissues are fed the more slowly do they throw off inflammatory or other diseased conditions. The writer has substituted for hot sand bags, which he kept applied to the affected arm or leg, or other hot applications used for the same purpose, by the application of methods which he credits to what he calls Bier's methods, employing superheated hot air. He now believes that the best method of applying superheated air is by means of the hot air douche along the course of the affected nerve, claiming that it gives decidedly better results than the use of the hot air boxes. The treatments are to be made two or three times daily, or even oftener, according to the severity of the case, each treatment lasting from one-half to three-quarters of an hour, applying the douche as hot as it can be borne, taking pains not to burn the skin. He states that after a few treatments the tolerance of the patient increases. The application of heat is regulated by holding or conducting the tube nearer or less closely to the surface or moving it more rapidly or slowly over the skin. He employs the hot air douche described in the Department of New Apparatus in the JOURNAL OF ADVANCED THERAPEUTICS for June. He claims for the treatment two important objects—alleviation of pain and, as he says, the cure of the disease, believing that the cure is effected by active hyperemia, not only in the skin to which the heat is applied, but also in the underlying tissues, including the affected nerve trunks. The writer, in concluding, does not claim any miraculous cures, pointing out that the process of repair is necessarily slow, but asserts that the process of repair is stimulated and the cure of the disease satisfactorily shortened by that plan of treatment. In the *milder* forms, which are fully as common as the severer forms, the hot air treatment is as near a specific as he can wish for. Before concluding he states his faith in the administration of the salicylic group, some of the coal tar preparations, and codein for the comfort of the patient during the cure.

The writer reports two cases. One, Mrs. B., first seen on December 26, two weeks after the onset of a neuritis in the right arm. In this case there was marked tenderness along the course of the musculo-spiral nerve and above the clavicle from pressure on the nerve trunks of the brachial plexus, with numbness in the thumb and radial half of the dorsum of the hand and loss of sensibility to touch in the same area were present. The pain was intense. This patient was put to bed, warm electric pads wrapped about the affected arm, and hot air douches of an hour's duration given three times a day; phenacetin, aspirin, and codein in moderate doses, and occasionally veronal. For two weeks the improvement was slow, after which there was a gradual but constant improvement. By February 10 the patient was free from pain. From indiscretion, two weeks later, there was a severe relapse. The hot air douche was again applied and removed the pain. By March 7 she was completely and permanently cured.

The second case, C. L., age 72, came under observation Oct. 18, 1908, on account of pain in his right arm, from which he had suffered for two weeks until it had become unbearable, with tenderness along the brachial plexus above the clavicle, and very marked tenderness along the musculo-spiral nerve. The treatment was rest in bed and the hot air douche for thirty or forty minutes twice a day and electric pads about the arm. The patient would not take drugs. After five or six days there was gradual but steady improvement. The patient was up in ten days. In six weeks after treatment was begun the patient was well.

The method employed by the writer, while in these two cases after protracted treatment terminated favorably, does not compare favorably with the results obtained from the static current, which ordinarily in early cases effects a complete cure within ten days, with almost complete relief from suffering for hours following each treatment, and it is never necessary to enjoin rest in bed even in severe cases of sciatic neuritis, the trauma to which the writer refers being insignificant when the muscular spasm and infiltration are removed, as they are promptly when that current is applied over the site of the lesion. The method, however, will be of service to those who are unable to employ static methods, and in patients who can afford the time and cannot obtain the more effective treatment. Radiant light, however, is a far more practical way of applying heat in these cases, and far more penetrating than the applications of dry heat by any method.

In all chronic cases, in which the static current uniformly succeeds, the method by dry heat or radiant light and heat is certain to be ineffective, because the induration that has formed about the site of the affected nerve cannot be effectually removed by hyperemia alone. It requires the mechanical action of such a modality as the static current—wave current or sparks, or both—to effect the dispersion of such exudates, and will require a time relative to the extent and character of the exudation.—[EDITOR.]

BOOK REVIEWS.

THE TREATMENT OF SYPHILIS WITH SALVARSAN. By Sanitätsrat Dr. Wilhelm Wechselmann, of Berlin, Medical Director of the Skin and Venereal Disease Section, Rudolph Virchow Hospital, Berlin, with an introduction by Professor Dr. Paul Ehrlich, of Frankfort-on-Main, Director of the Royal Institute for Experimental Therapeutics, Frankfort. Only authorized translation by Abr. L. Wolbarst, M.D., of New York, Consulting Genitourinary Surgeon, Central Islip State Hospital; Visiting Genitourinary Surgeon, People's Hospital; Professor of Genitourinary Diseases, New York School of Clinical Medicine, etc. With 15 textual figures and 16 colored illustrations. New York: Rebman Company, 1123 Broadway. London: Rebman, Limited, 129 Shaftesbury Avenue. Price, cloth, \$5.

This work is from the pen of a writer whose large experience in the employment of Salvarsan is an assurance that the opinions expressed will be deserving of consideration. Ehrlich, in his foreword, has added value to the work by expressions of confidence in the opinions of the writer. Ehrlich states that Wechselmann "was the first to find out the excellent effect of Salvarsan, particularly in those cases of malignant syphilis where the former methods of treatment often fail after years of medication." In cases of recurrence after the method, Wechselmann has assumed that it is due to spirochetal foci, which cannot be attacked by the remedy on account of an imperfect vascular supply. This explanation is accepted by Ehrlich. In this work Wechselmann has explained the methods and technique of administering the remedy, as well as the physiological process of elimination of arsenic through the urine and intestines. He also gives a review of the literature and experiments with Salvarsan, with a summary in which he deplores the too emphatic employment of the word cure, but encouraging the opinion that cures are certainly possible under the proper technique in selected cases. He reports a large number of cases treated, and gives numer-

ous illustrations showing the remarkable effects of treatment in numerous cases. From the colored plates, the evidence of prompt improvement is shown in cuts showing conditions after intervals of treatment. The work is printed on glazed paper, with 15 textual figures, and 16 colored illustrations. This is probably one of the most reliable books on the subject yet published.

* * *

OUTLINES OF THE THEORY OF ELECTROMAGNETISM. A series of lectures delivered before the Calcutta University by Gilbert T. Walker, M.A., Sc.D., F.R.S., Director-General of Observatories, India, and formerly Fellow of Trinity College, Cambridge. Cambridge: At the University Press. 1910. Price, \$1.

This work is a technical volume treating of the subject of electromagnetism, and represents a scientific study of all phases of the subject, including application of vectorial methods of magnetostatics, the theory of Maxwell as expressed by Hertz, the electron theory of Lorentz applied to the stationary media, and the electron theory of Lorentz applied to moving media. For one who wishes to consider this subject thoroughly in the language of higher mathematics the volume is valuable.

* * *

AERIAL LOCOMOTION. By E. H. Harper, M.A., and Allan Ferguson, B.Sc., with an introduction by G. H. Bryan, Sc.D., F.R.S. Cambridge: At the University Press. 1911. Price, 40 cents.

This little volume modestly lays no pretensions to originality, but treats the subject of aerial locomotion from all points of view, up to the present time, treating of the general principles, propellers and motors, stability and control of aeroplanes, model aeroplanes and gliders, etc. The work is written in good style, and shows a practical knowledge of the subject which will be of interest to all young Americans, and the older ones that are interested in the subject of aerial navigation.

* * *

ELECTRICITY IN LOCOMOTION. An Account of Its Mechanism, Its Achievements, and Its Prospects. By Adams Gowans Whyte, B.Sc., Editor of Electrical Industries and Electrics. Cambridge: At the University Press. 1911. Price, 40 cents.

This little volume attempts to give a clear picture of the part which electricity has taken and will continue to take in the development of locomotion, treating the subject in a concise and practical manner, in all departments of electric locomotion, with the comparison of the earlier and modern methods.

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THE TWENTY-FIRST ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

IT is not likely that there will be another occasion during the year that will offer so much of interest to members of the medical profession devoting their attention to physical therapeutics, as the coming session of the American Electro-Therapeutic Association; none, either that will afford an equal opportunity for educational influence.

Few except the members of that Association understand the enthusiasm and earnestness of these sessions, devoted as they are to scientific investigation and exposition of the truths of what is truly scientific in therapeutics. All ethical physicians who are not members of the Association are eligible to membership; and the sessions are open to all who wish to attend.

These sessions will be held on the 5th, 6th, and 7th of September, at the College of Physicians in Philadelphia, and an exhibit of all that is new and best in electro-therapeutics and physical therapeutics will be on view, with demonstrations, in the same building.

The Rittenhouse Hotel, one half block from the College of Physicians, will be the headquarters of the Association for the sessions. This is a first class hotel, with rooms at terms ranging from \$1.50 per day up, European plan, and \$4.00 per day up, American plan.

PHYSICAL THERAPEUTIC MEASURES AS ACCESSORIES TO SURGERY.

THE range of indication for the scientific application of high potential currents in post-operative surgical cases is increasing, as experience demonstrates their importance.

In the operative procedure, the aim of the surgeon is to obtain primary union. Delayed union from any cause may prolong the process of repair for weeks. The application of radiant light and heat over the site of a surgical operation for half an hour twice daily will facilitate the healing process remarkably, and at the same time relieve the post-operative pain due to the manipulation of the delicate tissues during the operation. It is possible, by the use of radiant energy or the static brush discharge to very materially shorten the time usually necessary to obtain primary union.

Often when these measures have not been employed promptly after the operation there will be delayed union with beginning induration in one or both of the margins of the wound. The application of the static brush discharge over the line of suture in such cases will remove the induration, when healing will promptly take place. Furthermore, the removal of induration in this manner removes pain and tenderness and reduces the scarring to a minimum because the induration itself causes pressure and scarring.

There are few operations which cause more local pain and discomfort to the patient than the surgical removal of hemorrhoids, especially when clamp and cautery have been employed, because in these cases induration is certain to follow the very irritating process that determines stasis to the parts.

When the surgeons appreciate the great relief that will be afforded by the employment of the static current in these cases, they will not neglect to use it. A hemorrhoidal vacuum electrode of small size passed into the anus, and held in position and the direct vacuum tube current employed for ten minutes, and then followed by the introduction of a larger tube for ten minutes longer employing a spark gap of two to four inches, will remove the induration to such an extent that there will be little or no discomfort experienced by the patient from soft fecal passages. It is very safe in all cases to employ this method on the day following the operation

and every succeeding day until the healing is complete. If this is done, the patient will have practically no suffering, except during the first day, and the repair will be effected within a week, this, too, without a possibility of subsequent stenosis, for there will be no scar tissue if the induration is removed.

The treatment of sprains, bruises, contusions, lacerations, fractures, in fact all traumatic injuries, by the static current in connection with the readjustment of the parts if displaced or lacerated, will shorten the period of repair often for weeks, give far better cosmetic effects, and coincidentally relieve the suffering of the patient.

If a static machine and radiant light apparatus were placed in operation in every hospital for the treatment of these surgical cases, and the young internes instructed how to employ them, the medical profession would soon become acquainted with their great value. It would hasten their recognition, and they would not be considered, as they too often are, as the theories of enthusiasts.

As a matter of fact, the time has come when these things are no longer to be ignored; and the surgeon or physician who will belittle them will be subject to the criticism of the patient, who finds relief from their use by those who employ them intelligently.

THE PRESENT ATTITUDE OF THE INVESTIGATORS IN RESEARCH LABORATORIES TOWARD THE TREATMENT OF ANTERIOR POLIOMYELITIS.

WE regret to observe that the statement is being made by laboratory investigators that anterior poliomyelitis is incurable, and without any practical method of treatment. This can be excused only on the ground that these investigators have not discovered a method of treatment of the sort in conformity with their line of investigations—a serum or antibody—and are not informed regarding what others are doing. It is not likely that a serum or antibody will ever be employed, except as a prophylactic measure, which will then be of no avail except employed upon the community at large. After the onset of the disease, conditions present themselves which have been demonstrated to be amenable

to treatment. An investigation of other means of treatment, under these conditions, is of greater importance, or of as great importance as the study of a cause which can only be remedied by universal vaccination. The cause of this trouble is not alone in the human being, but also in animals, and may be taken from some fungus or other organism which exists in the soil as tetanus does; for the history of many cases of this disease indicates that they have had their onset following exposures of the bare surfaces upon the sands or soils of the country.

It seems, therefore, that the subject of greatest importance is the study of the treatment of a disease, the onset of which is so insidious, and from such uncertain causes, that the prophylaxis is at least uncertain. That there are no methods of treatment of anterior poliomyelitis that are effective it is not wise for any investigators to assert, for many careful observers have proved the contrary.

BREAKING AWAY OF SURGICAL PRE- JUDICE TO THE ROENTGEN RAY IN THE TREATMENT OF CANCER.

THE best estimate of the attitude of the surgeon toward therapeutic measures is what they have to say about them. When a leading surgeon takes the stand that every surgical operation for cancer should be followed by the systematic use of the Roentgen ray, there is certainty of conviction in the statement.

An eminent professor of surgery in one of the leading medical colleges stated recently that he was convinced, from the results of the X-ray in non-operative cases, that the X-ray was to be hereafter a factor in all cancer cases, and that at least post-operative raying should follow every operation.

The signs of the times point to a broader conception of important therapeutic truths which have been gradually worked out, not always in the great universities, but by earnest students of agents other than drugs and surgery. In other words, the tendency of the profession is to broaden its field of operation. This is a source of great satisfaction to those who have labored long and hard to establish truths which have been well demonstrated in their own experience.

HIGH ARTERIAL BLOOD PRESSURE AND
TREATMENT.*

BY BYRON SPRAGUE PRICE, M.D., C.M., NEW YORK.

Hypertension and its more or less accurate measurement have in recent years only taken a prominent position in the diagnosis of diseased conditions, though the history of such measurement dates back to 1876. Along with the definite establishment of remedy for high blood pressure has the importance of its recognition grown, until now the most gratifying results obtained by the physician are found in this line of preventive treatment, and a means of conservation of the race, offsetting to some extent the declining birth rate, especially in the same sphere of life, is already in operation.

Hypertension may exist for an indefinite period without arteriosclerosis, and then it is due to spasm of the arterioles. As a rule arteriosclerosis sooner or later follows, but even then the relation between them is not constant. Hypertension is not present in all arteriosclerotic cases at the time when they are first seen—probably in not more than two-thirds of them—leaving it imperative that an otherwise detailed examination be made of every patient and so not rely upon blood pressure alone. The pressure frequently falls secondarily and after some damage to the heart and arteries has taken place.

A strongly contracted artery or an extensively thickened and calcareous artery requires more pressure than an artery under the opposite conditions, in order to obliterate its pulse, and therefore gives a higher reading than is correct. In those occasional advanced cases with high reading, not accompanied by cardiac hypertrophy or dilatation nor accentuation of the aortic second sound, we must be extremely careful in our diagnosis, and because of the arterial condition a few cases give a high reading, even with an extremely weak heart muscle. In a very small percentage of high readings of long standing there may be no evidence of cardiac enlargement, especially when associated with fatty right ventricle and small blood volume, or again with myocardial degeneration as in malnutrition.

*Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association at Saratoga Springs, N. Y., September 17th, 1911.

Causes for continued increase in blood pressure are multiple: 1. Toxæmia. 2. Obstruction offered by sclerosis of the splanchnic vessels, or the aorta leading to them. 3. Reflex arteriole contraction may occur to some extent, as in intracranial pressure—especially upon the medulla, granular kidney, etc. (though these cases may be largely toxic rather than reflex or compensatory). And occasionally increased heart action due to local abnormalities as in early valvular aneurism.

Of these causes toxæmia alone is highly important, and covers nearly all cases.

Arteriosclerosis may be caused by: 1. Toxæmia. 2. Continued high blood pressure. 3. General malnutrition as illustrated in the involutionary period (no doubt toxic, due to sub-oxidation). Of these causes, hypertension largely predominates.

So much for the causal relation between hypertension and arteriosclerosis, in which toxic agencies are the chief cause of hypertension, and the latter in turn the principal factor in the development of arteriosclerosis.

What, then, is the relation between toxæmia and hypertension, and that between hypertension and arteriosclerosis?

Toxæmia arises from many causes and produces its effects upon the circulation in some cases by direct action on the muscle plates of the heart and arteries. Nicotine, adrenalin, barium chloride, and ergot act directly upon the arterial muscle, probably also digitalis. Other substances act through the nervous system. While a number of drugs and bacterial toxins (including the bacillus coli) are known to produce a rise in arterial pressure, it is not determined whether they act through the nervous system or directly upon the muscle plates of the arteries, but in one way or the other they cause spasmodic contraction of the arterioles.

Clinically, it is certain that hypertension is nearly always present in cases exhibiting gastro-intestinal toxæmia of sub-acute or chronic type, and a sudden increase in tension usually occurs with an acute attack of such intoxication.

It is, however, much less common to find considerable elevation in blood pressure accompanying gastric disturbances than in colonic toxæmia (with indol, skatol, and toxic albumoses), where hepatic incompetency sooner or later occurs.

Conversely, it is true that hypertension is usually accom-

panied by toxæmia resulting from digestive derangements, as shown by chemical and bacterial examination. Some cases of hypertension do not show existence of gastro-intestinal toxæmia, but instead a morbid metabolism only. For example, gout, in which the purin bodies—derived from nuclein—fail to be completely converted into urea. This faulty fermentation and suboxidation results in the formation of certain undefined toxic bodies, accompanying the production of uric acid and the urates, which latter substances are quite inert. Probably also diabetes falls under the metabolic heading.

The exact relation existing between these metabolic disturbances and a preexisting alimentary toxæmia may be an important one, and there is much to suggest the causal relationship, though proof is wanting; however, these conditions are usually associated, for a part of their course, at least, with hypertension and their marked stages are preceded by it.

Substances other than bacterial toxines occasionally give rise to prolonged and injurious hypertension. Of which lead is an example. I have known such results follow prolonged use of adrenalin. In one instance it had been given to a patient (by an experimental enthusiast) in whom, at the age of thirty, a tension of 240 m.m. had developed, along with $\frac{1}{4}$ per cent. of albumen, marked dyspnoea, intense cardiac palpitation, and pain. All of these symptoms cleared up, tension dropping to 190 m.m. upon withdrawal of the adrenalin. So, also, may it be that the different internal secretions produce hypertension, either by some direct action or indirectly through disturbing digestion and assimilation or metabolism.

An increase in arterial blood pressure resulting from acute toxæmia—not long continued—promptly subsides upon relief of the cause, but advanced cases dependent upon long continued alimentary toxæmia, do not usually clear up as a result of disappearance of the cause. The stress already exerted upon the arterioles perpetuates their spasmodic recoil, until active treatment overcomes the condition.

The relation between hypertension and arteriosclerosis: That the former produces the latter is well recognized; also, that it frequently takes place without any primary injury or inflammation (no endarteritis). It develops along the lines

of physiological stimulation and strain, giving rise to fibrosis. In this way nature endeavors to make up for the gradual decrease of muscle and elastic tissue resulting from their inactivity and continued stretching.

A common form described by Adami proceeds by a localized bulging outward of the media, especially at the points weakened by branch arteries, taking on a form of fatty degeneration. The intima being better nourished, endeavors to compensate for this loss of support by an overgrowth of this fibrous tissue. This process is usually brought about as follows: The normal intima and inner layer of the media contain no nutrient vessels, being nourished directly by the main blood stream. The same is true in the early stages of fibrosis. As the condition progresses, multiplication of the fibrous tissue layers takes place between the inner and outer zones of the intima, completely filling the area of distension, until the central portion of this fibrous growth, becoming poorly nourished, begins to degenerate. If the condition continues to progress, calcareous deposits may take place in the necrosed areas of the media and intima. The results, cerebral hemorrhage, chronic interstitial nephritis, cardiac failure, etc., are too well known to call for comment.

Treatment must be directed both toward removal of the cause and lowering of excessive blood pressure. In this connection it should be said that every high tension should not, and under all circumstances, be reduced to a normal blood pressure, but to within from 10 to 30 m.m. of normal. Normal arterial pressure never remains above 135 m.m., regardless of age or individual, and if at any time in life it exceeds and remains above that point, the individual is not in perfect health; proof of this is abundant, but we cannot enter into it here.¹

The cause of hypertension will usually be found in connection with alimentary disturbances, giving rise to toxins. Under such circumstances appropriate measures must be followed for the thorough clearing out of the tract, as by calomel, castor oil, cascara, etc., colonic irrigations as called for, attention to the stomach and liver, flushing with water, correction of diet as indicated, usually reduction or temporary withdrawal of foods containing the purin bodies, and all bacterial culture media; for example, bouillons, eggs, fish, etc., and as far as possible nitrogenous foods, at the same time supplying large quantities of the farinaceous foods, green vegetables and fruits. Regulate hygienic conditions in general.

¹ Case reports indicating frequent and marked rise and fall in blood pressure—as occurring during a day or even a month, except the slight variations due to digestion and exercise—are significant, either of corresponding toxic exacerbations or incorrect reading, and nearly always of the latter.

Such partial treatment, while necessary, is only productive of evident results in mild conditions.²

If for any reason a patient cannot be at once within reach of appropriate measures, blood letting and incidentally removing poison has a useful effect in severe toxic states. Nitrites should be used liberally and frequently in urgent cases until proper treatment may be obtained. Iodides injure the heart muscle and further disturb digestion.

So much for this routine negative and unsatisfactory treatment. The positive and useful course of procedure, which is capable not alone of tiding a life over a crisis, but in all except the most seriously complicated cases of reestablishing conditions of relative safety for long periods of time, depends upon the thorough establishment of normal elimination with maintained oxidation and metabolism.

The d'Arsonval auto-condensation current fills the above indications in many cases. It should be given in doses of from 300 to 1000 M. A. from eight to fifteen minutes, according to condition of patient and source of current, every day, or every second or third day until blood pressure stands at a desirable height. This treatment should be continued for several weeks in average conditions, and may be aided by high candle power incandescent light, and in atonic cases by the Morton wave current over abdomen or liver. This latter current produces a slight rise in blood pressure, but it is only temporary as a rule.

If body treatments are given in superheated dry air, ranging above 350° F., and followed by proper precautions against too early disturbance of the resulting circulation, the duration of treatment is greatly shortened. By this means the results are decidedly better and more lasting.

Combined with dietetic and hygienic care, such treatment gives most satisfactory results. It produces no depression, but tone. It reduces tension to the desirable degree, and it remains there in all except very advanced cases or in subjects who disregard precaution. The oxidation is increased and maintained, the elimination established and continued, and as a result the alimentary toxines need not reaccumulate.

Cardiac symptoms of pain, dyspnoea, lividity or pallor, and physical signs of insufficiency disappear and remain absent. On the whole, such treatment is as gratifying as any in practice.

This being only a general summary, the many side features cannot be even referred to here.

Above results *are* obtained, however, and *only* obtained when details are carefully and fully observed.

65 Central Park West.

² The advanced cases requiring more energetic treatment.

TREATMENT OF CATARACT BY ELECTRICITY.*

SAMUEL J. HARRIS, M.D., BOSTON, MASS.,

Past Secretary N. E. Electro-Therapeutic Association, Etc., Etc., Etc.

History.—Cataract was well known to the ancient Greek and Roman physicians. On account of the gray appearance of the pupil, they denoted it by the name of glaucoma, which word in the course of time has changed its meaning. They had an erroneous impression of the nature of the disease in that they located the opacity not in, but in front of the lens. This body, bright as crystal, the most obvious thing when the eyeball is opened, was considered to be the seat of vision, such as we now know the retina to be. According to this view, the loss of the lens would entail total blindness, but since they knew that in cataract operations the removal of the lens restored vision, they could not consistently regard the opacity in the lens. They believed it originated from the pouring out of an opaque liquid between the iris and the lens. Since it was thought that this fluid fell from in front of the lens, the name cataracta (cataract), which we still employ, came into use in the Middle Ages.

Our knowledge of the true nature of cataract dates from the seventeenth century. Mariotte and Boerhaave recognized the situation, but their doctrines did not gain general acceptance. It was not until 1705, when Brisseau, a French surgeon, had the opportunity of performing an autopsy on the body of a soldier who had a mature cataract. Brisseau, on doing the operation of depression (which the ancients knew about), found that the opacity he had depressed into the vitreous was the lens. He laid his observations, together with his conclusions drawn from them, before the French Academy, but obtained no credence. The Academy confuted him by holding up the doctrine of Galen. It was not until three years later, when new proofs had been brought, that the Academy accepted the new doctrine, which soon found general acceptance. Thus we find men of the seventeenth century not wholly unlike some of to-day, who still cling to old theories despite the advance of progressive thought and in the light of modern science and overwhelming evidence.

* Read before the Twentieth Annual Meeting of the American Electro-Therapeutic Association at Saratoga Springs, N. Y., September 17th, 1911.

ANATOMY OF LENS.

The crystalline lens, as it is called, lies between the iris and vitreous. It is a biconvex body which lies in the anterior portion of the eye and, together with the zonula, divides the eye into a smaller anterior and a larger posterior section. The vitreous is behind and the aqueous chamber is in front. The posterior surface is the more convex.

It is composed of a harder central portion known as the nucleus, and a softer portion known as the cortex. The boundary line between the two portions is not sharply defined, the nucleus deriving its greater density from a process which essentially is a loss of fluid, and this being a progressive process, the nucleus increases in size at the expense of the cortex in proportion to the age of the individual. The nucleus has a yellowish color as compared to the cortex, and also a greater refractive power. In elderly persons these properties frequently make the lens as seen through the pupil present a grayish or opaque appearance, due to increased reflection of light from the surface of the lens (increased lens reflex). This is extremely important in making a diagnosis of cataract, for it may be mistaken for an opacity of the lens. The lens is composed of prismatic fibres joined together by a small amount of cement substance. These fibres are elongated epithelial cells. The centre of its anterior and posterior surfaces is known respectively as the anterior and posterior poles. The circumference is known as the equator. The average size of the lens is nine m.m. in diameter and four m.m. in thickness. It is enclosed in a delicate, structureless lining membrane of perfect transparency known as the capsule; this is divided into an anterior and posterior capsule, and is held in place by a suspensory ligament known as the zonula ciliaris or zonule of Zinn, does not contain any blood vessels, but derives its nutrition from the fluids surrounding it. The absence of blood vessels prevents it from showing signs of inflammation and explains how inflammatory conditions of the choroid exert a deleterious influence on it.

VARIETIES.

All opacities of the lens and its capsule are included under the name cataract, although this should not be the case, as the

history of the name explains how the word came into use; it is really a relic, but would cause too much confusion to change now.

There are several different kinds of cataracts met with clinically. They may be described according to their clinical appearance: etiology, site, degree of progress, or the age at which it appears. Thus, it is primary when it develops without any preceding or accompanying ocular disease, and secondary when its origin can be traced to traumatism or morbid processes in the ocular tissues.

Primary cataract is classified according to its stage as incipient, advanced, or complete, unripe, ripe, or overripe; to its site, as nuclear, perinuclear, axial, polar, cortical, or diffuse; to its color, as gray, white, or black; to age, as juvenile or soft, hard or mixed; to its chemistry, as calcareous or bony; and to its systemic cause, as diabetic or nephritic, etc.

Secondary cataract is an opacity of the lens occurring before middle life. Before the age of 30 the nucleus of the lens is small and soft, while the cortical portion is relatively large. Soft cataracts are congenital or traumatic, or are due to local inflammation.

Hard Cataract.—In individuals past middle life partial or complete loss of transparency of the lens not due to traumatism, ocular, or constitutional disease is known as senile or hard cataract. Unlike soft cataracts, the nucleus is large and firm and the centre remains relatively soft until the opacity involves the entire lens. Opacity of the nucleus is known as nuclear cataract of the cortex, cortical cataract.

Senile Cataract.—This paper will deal entirely with senile cataract. This we know to be uncomplicated, primary opacity of the lens in individuals who have passed the meridian of life. This form of cataract is the most common as well as the most important with which the ophthalmic surgeon has to deal.

ETIOLOGY.

Senile cataract originates without any known pre-existing disease of the eye. Often no other cause than senility is manifest, but it cannot be called a physiological process, such as the hair turning gray. It would seem essential that either constitutional or local abnormal conditions existed since senile cataract appears at widely different ages. The favoring con-

ditions are premature age, arteromatous vessels, inheritance, physical weakness and errors of refraction. The last named cause is difficult of positive determination, yet I believe it is the cause in some cases, for it seems reasonable to suppose that years of accommodative strain and the choroidal congestion necessarily entailed would lead to alterations in the nutritive supply of the lens and thus cause an early opacity.

Leratus Connor¹ claims senile cataract is a local manifestation of poor nutrition incident to improper dietetics. The striae are caused by shrinking of the lens substance from failure of the capsule cells to perform lens fibre adequate to fill the vacancy left by those that constantly join the nucleus. The result is an open space filled with lymph, making striae, which after a time undergo changes into dots, granules, and general opalescence. Any systemic disease which interferes with nutrition may be responsible for these lenticular changes.

There are so many diseases of the nose and accessory sinuses that affect the eye that I began an investigation to see if there was any possible relation between these affections and cataracts.

Onidi² found in 15 cases the canalis opticus communicating freely for 6-8 and 10 m.m. with the posterior accessory sinuses. The semi-canal is ethmoidalis is of great importance in this respect because it communicates freely with the ethmoid cells, and contains veins which are covered only with mucous membrane. On the other hand, the mucous membrane is in contact with the orbital periosteum and dura mata. The condition of the canalis opticus is often responsible for the venous stasis in the optic nerve and for the extension of inflammatory processes. Thus, it can be seen that these facts taken into consideration, there is every reason to believe that such condition existing might cause interference with the nutrition of the eye and lead to cataract. It has been my practice to examine the nose and accessory sinuses thoroughly in all eye cases. I cannot impress too strongly upon you the importance of this point. The close relationship existing here has not been taken into account as much as it should be. The optic nerve is frequently in close relation to the posterior ethmoidal cells and the thinness of the intervening wall makes the

¹ *Ophthalmic Record*, January, 1909.

² *Pester med-chir. Presse*, October 4, 1908.

involvement extremely likely. Thus, we find ocular paralysis, neuralgia, especially retrobulbar, and asthenopia frequently due to sinus affection, and there is every reason to believe that it might possibly cause cataract.

Demets³ found senile cataract and zonular cataract existing as a sequel of hypo-thyroidism in adults.

E. M. Whaley⁴ found in examining the eyes signs in 35 pellagra—3 cases of bilateral cataract, unilateral 2, cloudy 1.

PATHOLOGY.

The earliest recognizable change is shrinking of the nucleus from the cortex and the formation of spaces filled with an albuminous clear fluid. The fibres bounding the spaces become opaque and in places swollen. Among them we find fat globules. Next we find breaking of the lens into a mass of fibres and albuminous fluid. Here the lens separates from the capsule and in the space fluid collects. The centre is distinguished by its degeneration into a milky, semi-liquid substance. Eventually the nucleus becomes calcareous and the entire lens is degenerated. If the process continues the fluids are absorbed, there is a formation of fine cholesterin crystal, a deposit of calcareous material upon and opacification of the capsule, and its transformation into a fibrous membrane.

STAGES.

Incipient Cataract.—The beginning of opacity is marked by streaks that extend from the periphery to the centre of the lens and resembles the spokes of a wheel. By oblique illumination these streaks appear grayish, but by ophthalmoscopic examination they appear black. The portions of the lens between the striae remain clear. Frequently the opacity begins as dots or clouds coalescing as maturity is reached. These may form at the cortex or in the nucleus and gradually extend over the entire lens, the stage of swelling or intumescence. The stellate appearance of the lens is more distinct and the cataract appears bluish white. Myopia makes its appearance in this stage.

The early diagnosis of lenticular cataract is of the greatest importance both to the patient and to the physician. It is in

³ *Wien. Klin. Wochenschr.*, September 24, 1908.

⁴ *Ophthalmic Record*, November, 1909.

this class of patients that our best work is done. As many of these cases are first seen by their family physician, it is of the utmost importance that the case be sent to the ophthalmic surgeon, who can do something for them, instead of waiting until the patient is totally blind and then trusting to removal of the lens. To be able to do something for these cases and prevent the misery caused by the constantly failing vision means much for the cause of electricity.

Mature Cataract.—A cataract is mature when the lens is completely translucent and, unlike the first and second stage, is not swollen but has returned to its original size. The eye is obliquely illuminated; if the iris throws no shadow on the lens substance behind it, or if no shining sectors are seen and there is no transmission of a reddish glare, the cataract is ripe or mature. There is a peculiar mother of pearl lustre to the lens under oblique illumination.

Hyper-mature or overripe cataract, the cortical portion undergoes fatty degeneration and liquefaction.

PROGRESS.

The duration of the stage of incipency is varied. In some individuals, from no assignable cause, the opacity extends rapidly and the lens becomes entirely opaque in a few months or even less time. In others the growth is extremely slow and the opacity may remain the same for years. This is particularly true of cortical cataract. The rate of growth and an accurate or even approximate estimate of the time required for the ripening of the cataract can be made only after several examinations at long intervals.

SYMPTOMS.

Often the first symptoms complained of are the appearance of motes before the eyes and of monocular polyopia. Motes are complained of also in disease of the vitreous humor, but here they float over a large portion of the field of vision, while in incipient cataract they remain stationary. The polyopia is due to the irregular refraction in the media, which causes many of the objects complained of to be formed on the retina. These symptoms seem to annoy these patients more in the evening. The next important symptom is a gradual dimness of vision; this becomes the more marked the more the cortex at the anterior and posterior poles of the

lens is involved. In those cases the patients see better at dusk or with their backs to the light. But, according as the lens becomes more and more opaque, the acuteness of vision is reduced until finally even large objects cannot be discerned.

TREATMENT.

Having discussed the history, cause, variety, symptoms, pathology, and progress of cataract, we must now come to the principal object of this paper—the treatment of cataract. Most all of the text books and authors tell us that nothing can be done in these cases to stay the progress of this unfortunate disease or condition, excepting to wait until the patient becomes blind in at least one eye, and then remove the lens by an operation. We have shown that the time of the ripening of a cataract varies from a few months in some cases to a period lasting over many years, and in some this period is over thirty years. In fact, some cases remain stationary for a number of years and then suddenly, with advancing age, reach maturity, the patient often being so advanced in age and sometimes so enfeebled that, besides the mental misery caused by failing vision, they must remain blind because an operation would be too much of a shock to the system. No one who has observed the mental suffering caused by this gradual approach of blindness without any hope of cure before total blindness, and then by the knife, can realize that every avenue of research should be opened up to find something that would cure or stay the progress of this most lamentable affection.

Some years ago I began to investigate the use of electricity in diseases of the eye. After learning that the action of the galvanic current was a definite and positive fact and not a fancy, I applied it with various other currents in my practice, and obtained most excellent results in many cases supposed to be incurable. After this success, and knowing the physics of and the physiological effects of the currents, I began to investigate its use in opacities of the cornea and later in opacities of lens, or what we call cataract.

The literature bearing upon the treatment of cataract by electricity is extremely small. The ophthalmologists seem to have a peculiar prejudice against the use of electricity, but as some who have done considerable research in this line have had such excellent results, the prejudice is gradually fading.

AUTHOR'S EXPERIENCE.

For the treatment of these cases I have employed the constant current, the X-ray flash, the high frequency current, the white light and vibration to the spine. Knowing the action of the cathode of the constant current, it seemed to me it offered an ideal method of treating such cases. The high frequency current improves nutrition and I have used it in conjunction with my constant current; but as it is necessary to prove just what current acts favorably upon the cataract, I shall not speak of the other currents I have used, but confine myself to the constant current.

PHYSIOLOGICAL ACTION OF GALVANISM.

Galvanic direct or continuous current flows without interruption in one direction. The chemical production of zinc chloride at the zinc plate produces an electrical current which flows from thence to the carbon and through the external circuit of cords and patient back to the zinc. The cord attached to the carbon is, therefore, positive or anode; and the one to the zinc negative, or cathode. The voltage required is comparatively low (50), but the milliamperage furnished sometimes is very high (250), to produce chemical or electrolytic, thermal, and magnetic effects. When interrupted, it still intermittently causes electrolysis. If metal electrodes be placed in a solution of salts, marked polar effects are shown. O. acids I. Cl. Br. appear at the positive pole; H. and bases (alkalies) at the negative.

The galvanic current is highly electrolytic. It is distinguished by the opposite current and nerve effects produced at the anode and cathode. At the anode the acid reaction tends to coagulate the blood, checks bleeding, hardens the tissues. The anode is also a vaso-constrictor and a sedative. The cathode excites an alkaline reaction, tends to liquefy tissue, and in a caustic dose produces a soft cicatrix. It is a vaso-dilator, producing hyperemia, hyperæsthesia, and the smaller the active electrode the more lines of flux are concentrated in the tissues.

Roosa observed that the retinal arteries increased in size and more blood vessels were brought into view. Hackley observed enlargement of both arteries and veins.

Considering that the constant current has two poles giving

opposite chemical and nerve effects, it is necessary not only to be skilled in the uses of the currents but to have a definite knowledge of the pathology of the disease to be treated. Here it becomes necessary to select the pole which will accomplish the results desired. The cathode tending to liquefy tissue and being a vaso-dilator producing hyperemia, and the condition we have to treat being one of hardening of the lens, then it must be the cathode we wish to use.

Technique.—I use a wall plate, and I believe men doing electrical work, especially so near the brain, should buy the best that skilled workmanship can produce and that money can obtain. I did at one time use sponge electrodes, but have discarded them, for the porosity of the sponge causes the current to flow unevenly. The cause of much failure has been the small sponge electrodes and the small pads used, thereby causing not only an uneven flow of current, but limiting the amount to an extremely small milliamperage. To do the most good it is necessary to give from five to fifteen milliamperes. To do this I had made for me two eye cups connected by means of rubber tubing to a metal centre piece with an end for the attachment of my cathode. Inside these cups I had a metal disk made attached through the rubber tubes to the centre piece. These cups are filled with clay or antiphlogistine, then covered with chamois and tied with rubber. The centre piece is attached to the cathode of the constant current and the cups placed over the eyes; a large pad is placed at the nape of the neck and fastened by a collar. The cups and pad have previously been saturated in salt solution, the current turned on gradually until ten or twelve milliamperes are reached or a slight burning sensation is experienced.

This is kept up from ten to fifteen minutes daily for ten or fourteen days, then gradually reduce the sittings to every other day until the signs of improvement are present, then the sittings are gradually lengthened until the patient is cured. The cure of these cases may take from two months to a year, depending entirely upon the condition of the cataract when the patient presents himself for treatment.

CASES.

Mrs. A., age 66. Case referred by Dr. R. J. Thompson Fall River. Incipient cataract in both eyes. Short lines and

nebulæ. O. D. eye $V=20/60$ O. D. $20/50$. Reads Snellen No. 5. Patient showed signs of improvement after four or five treatments. Treatments continued every day for fourteen days and then every other day for a period of two months, then once a week. Result of four months' treatment: O. D. $20/20$, O. S. $20/20$. Reads Snellen No. 2. No lines or nebulæ visible. Cataract diagnosed one and one-half years ago by three competent oculists. The result here has been a perfect one.

Mrs. B., age 72. Peripheral cataract, long and short lines, with dense nebulæ. Patient has been losing vision for thirty years. *Cataract diagnosed* thirty years ago by well known oculist. V. O. D. $20/200$, O. S. $20/100$. Reads Snellen No. 8 with left eye. Patient treated daily for three weeks, then gradually reducing it to once a week for six months. Result: V. O. D. $=20/40$, O. S. $20/30$. Reads Snellen No. 4. Patient improved after first ten treatments and vision has been stationary since.

Mr. C., age 70. Peripheral cataract both eyes. Referred by Dr. Peterson, New Bedford. Cataract diagnosed by a competent oculist two years ago. Vision failing rapidly within the six months previous to treatment. V. $=$ O. D. $20/200$, O. S. $20/120$. Treatment continued over period of three months. Result: V. $=$ O. D. $20/80$, O. S. $20/60$. Patient still under treatment.

Mrs. D., age 72. Peripheral cataract. Case referred by Dr. F. H. Morse, Boston. Cataract diagnosed thirty years ago. Long and short spikes, dense nebulæ. V. $=20/200$, O. S. $20/200$. Treatments extended over four months. Result: O. D. $20/40$, O. S. $20/40$. Reads Snellen No. 4.

Mr. E., age 80. Peripheral cataract, incipient short spikes, dense nebulæ. Cataract diagnosed two years ago. V. $=20/100$ O. D., V. S. $20/80$. Treatment one month. Result: $20/20$ O. U.

Judge F., age 55. Peripheral cataract ten years' standing. Case referred by Dr. C. B. Tefft, Utica, N. Y. Cataract diagnosed by oculist ten years previous to my seeing patient. Long and short spikes, dense nebulæ. V. $=$ O. D. $20/200$, O. S. $20/120$. Treatment six months. Result: V. $=20/40$ O. D., $20/40$ O. S. Two years after remained same.

Mrs. G., age 40. Incipient cataract, short spikes and nebu-

læ. V.=20/100 O. D., O. S. 20/80. Treatment two months. Result: V.=20/20 O. U. No lines, spikes, or nebulæ.

Mr. H., age 65. Case referred by C. B. Tefft, Utica, N. Y. Peripheral cataract of seven years' standing. Cataract diagnosed by competent oculist seven years ago and since confirmed by five others. Long and short spikes, dense nebulæ. V.=O. D. 20/80, O. S. 20/100. Reads Snellen No. 8. Treatment continued three months. Result: V.=O. D. 20/30, O. S. 20/40. Reads Snellen No. 4. Two years after vision remains unchanged.

Time will not permit the report of any more of these cases, but these will suffice to show improvement that has been made in these cases, although some are of long standing.

From these cases it will be seen that mature cataract I have not attempted to treat by electricity, because I prefer to operate on such cases, believing that to be the quickest way to restore sight. No remedy, drug, or other means has been shown to produce so manifold physiological results as electricity, and no combination of drugs has caused so phenomenal restoration of degenerated and infiltrated tissue to normal structure and function. The *modus operandi* of drugs is a sealed book compared with the demonstrated action of electricity. Of all forms of electricity, galvanism furnishes the greatest variety of useful applications to the eye and also requires the greatest skill for its successful application.

CONCLUSIONS.

Incipient cataract can be cured provided the case is sent to an oculist who is an expert in the therapeutic use of electricity, and the patient treated by the method described.

That cases of long standing, where there are no chorioidal changes, the vision can be improved and the progress of the disease stopped and sometimes cured; that some cases improve immediately and others remain stationary for a long time and then improve.

Some cases improve all they will improve in the first month and then remain stationary.

In all cases in which the disease is progressive, as indicated by fat granules and nebulæ, and when there are no complications of cirrhosis of kidneys or liver, diabetes, or organic disease of the heart or lungs, improvement may be expected.

Where the radii were fully degenerated I have never seen them absorbed. In cases where the vision has remained stationary for some time and there are structural changes in the choroid and retina, I have never seen any improvement. But there are many advanced cases that do not show these changes that by long treatment much can be done.

Mature cataract, with our present state of knowledge, should be operated upon, my preference being without an iridectomy after the method of Dr. John Morgan, of Boston.

Every chance should be given these cases to prevent the loss of vision.

I have had experience in a large number of these cases, and I have been able to cure many cases of incipient cataract. These are the cases, with our present knowledge, that should be sent to the oculist. In most instances the progress of the disease can be checked and often a complete cure results.

This subject is still in its infancy, but the rapid progress made encourages us to continue the investigation, and as improved technique and improved apparatus appear there is no reason why as much cannot be done for cataracts as there is being done for tuberculosis and other diseases. I see no reason why we should content ourselves with the work done in the past, for it was not many years ago when the incandescent lamp was declared an impractical and an impossible commercial article, but it took an Edison to lead these men out of darkness into the brilliant light. So it is to-day with many of the diseased conditions where various methods have been employed—improved apparatus has changed the whole scope and the possibilities of success are greater.

Were we compelled to spend our days in habitations where the windows were ground glass, we could more easily appreciate the fate of these unfortunate individuals, the sequel here being complete loss of vision. It is readily understood, therefore, how important is a correct knowledge of the various morbid processes affecting the lens and how untiring the specialist should be in his efforts to combat the progress of disease and in search of measures to alleviate the unfortunate sequelæ. We can afford to leave no therapeutic path unexplored. The opinion of many persons who have received benefit from this treatment stands out as a great step in advance for electro-therapy in ophthalmology.

THE DIRECT D'ARSONVAL CURRENT IN THE TREATMENT OF DISEASES OF THE CENTRAL NERVOUS SYSTEM.

BY FREDK. DE KRAFT, M.D., NEW YORK.

The writer of this paper is convinced of the very great utility of the direct d'Arsonval current in the treatment of certain diseases of the central nervous system. In practicing this method one should utilize a very large dispersing electrode covering the entire back, and a metal electrode suitably shaped and firmly and evenly applied to the head, the hair being carefully moistened with soapy water or salt water. The electrode on the back is attached to the one end of the d'Arsonval solenoid and the one to the head to the other end of the solenoid. If the frequency of spark discharge at the spark gap is sufficiently great and the length of spark at the gap very short at first (one-quarter inch), the skin under the electrodes will soon become warm and moist with perspiration. When this occurs the spark may be carefully lengthened without fear of resulting burn. Such a procedure will produce an intensification of the circulation in the parts acted upon, with resultant improvement in nutrition as the result of a greater supply of freshly oxygenated arterial blood, and as a result of greater activity in the lymphatic stream. Cases of syphilitic periostitis of the bony covering and gummatous deposits with their resultant inflammatory thickenings in the meninges may be greatly benefited, with the result of disappearance at times of old palsies. It is more than likely that the action of K. I. on the exudate can be furthered by reason of bringing the remedy into more intimate contact of the affected parts as a direct result of the arterial hyperemia. A case of long standing hemiplegia of the left side, the result of a gumma, which had resisted large doses of K. I. and mercury, was cured in this way in less than a dozen treatments, and has remained well for the past three years.

In cortical epilepsy, the result of trauma, this same method should prove worthy of trial. A young man who received a fracture on the left side of his head at the back of the parietal bone had a very large cicatrix as the result. This accident occurred as the result of a fall ten years ago. Every sort of treatment having been faithfully tried to ameliorate

the epileptoid seizures, of which he had a great number daily, the writer suggested to the parents the advisability of applying the ray to the back of the head, and continuing the X-ray on alternate days till the hair fell out, then cover the left side over the site of the fracture till a reaction was produced, to be followed by the same procedure over the right side. Treatment was begun in January, 1911. Some result appeared to be obtained from the X-ray from the moment it was applied over the old scar. The seizures became reduced in number.

The high frequency current was begun in February, 1911. Treatment was given every other day, K. Br. continued in the old doses.

There has been a constant lessening in seizures. At one time he had none for five weeks, then none for seven weeks, and now none since May 6, 1911. The improvement in mental force and general bodily appearance in this case is marked. The young man, who is now eighteen, was childish, almost idiotic, at the beginning of treatment. We hope to send in a communication on this subject *in extenso* at some future date. Meanwhile, we would recommend a trial of the method.

It would seem that d'Arsonval current, being free entirely from injurious effect on the delicate nerve structure, yet possessing, by reason of its great rapidity of oscillations, the property of introducing heat through molecular friction, intensifying local circulation, thereby rousing molecular activity, and by reason of improved nutrition of the nerve cell quieting an unstable equilibrium, would be a valuable adjuvant in epilepsy and chorea. It is likely that the detrimental effects of long continued treatment by bromides on the development of the brain and the mind, so often seen in such cases, can be overcome, if not completely, at least in part.



ROENTGEN RAY AS THERAPEUTIC AGENT.*

BY J. D. GIBSON, M.D., DENVER, COLO.

I have previously mentioned the influence of X-ray over lupus vulgarus, tubercular fistula, and tubercular glands. Many physicians consider the rays a specific in these cases. I consider the rays a specific in any tubercular condition. A specific is a remedy or agent that is supposed to produce a special and ordinarily constant effect or action in the prevention or cure of a disease. After eleven years of daily use of this agent in the treatment of all kinds of tubercular conditions, I find that in pulmonary tuberculosis it produces the following results:

1. An engorgement or hyperemia of the lungs.
2. That the number or quantity of rales are temporarily increased.
3. The cough is ameliorated by loosening and liquefying the sputum, making it easier for ejection.
4. Aiding the gradual reduction of temperature.
5. Relieving the pleuritic and muscular pains and soreness of the chest.
6. Improvement of the well being of the patient, as shown by gain in weight, slowing of pulse, improvement of digestion, etc.
7. Shortness of breath will be increased in advanced cases, due either to the toxin or to the pulmonary congestion.
8. During the third month of treatment, ordinarily, there will appear in advanced cases white flecks of sputum mixed with yellow. The white increases and the yellow decreases, until the white supersedes the yellow entirely.
9. Usually during the third month in advanced cases the rales begin to disappear, and I count on the majority of the lungs being clear by the end of the fourth month.
10. The X-ray has more influence on the second and third stage cases than on the incipient cases or cases of very slight involvement. The reason of this is that the autogenous vaccines are readily produced by the rays where you have large areas of germ infected tissue to contend with, while in the slight incipient cases it is difficult to make your vaccine, and

* Read before the Colorado State Medical Association, Aug. 16, 1911.

you have to depend upon mechanical effects entirely, which can probably be aided with tuberculin.

11. Any case that has vitality sufficient to react to the influence of the rays and furnish amboceptors or antitoxins, this completing the vaccine formation in the blood and tissues, is susceptible to improvement by the use of the rays, and with proper dosage, nursing, food, and care I have seen more than one patient almost raised from the dead.

12. The X-ray influence is not carried by the blood. It forces or draws the blood to parts itself.

13. It is not being dependent upon circulation, but, penetrating all tissues, bones, muscles, etc., it also penetrates the tubercles, old and young, with its inhibiting and death dealing effect on the bacilli—something that can be accomplished by no other agent.

14. X-ray is only a more intensified ether vibration than sunlight, and you can put more energy through the lung in ten minutes with the rays than you will get in a long time with sunshine.

These are some conclusions I have reached from observing some 300 cases in the last eleven years, thirty-eight of whom are dead from various causes; the balance are alive at this time, or 85 per cent., the vast majority of them being bread winners. By far the larger percentage were advanced second and third stage cases to begin with. Many of these cases do not react to tuberculin.

Pneumonia should be benefited by the rays. I have used it only in tubercular or unresolved pneumonia, where I have been pleased with the results.

Dr. Tice has been using the X-ray in typhoid fever with startling results.

Commonwealth Building.



Progress in Physical Therapeutics.

GYNECOLOGY AND ELECTRO-CHEMICAL SURGERY.

EDITED BY G. BETTON MASSEY, M.D.

The Virtue of Simple Electro-Chemistry in Moles and Warts.

A physician practicing exclusively as a chiropodist recently applied to the editor of this department for instruction in the electro-chemical treatment of small neoplasms on the feet, saying that he had been advised to use high frequency for this purpose, had procured an outfit and tried it, but that he had totally failed to destroy the warts or materially affect them.

As physicians interested in the physical forces in medicine and surgery, we are possibly less apt than our colleagues to dose our patients with the latest products of the dye factories of Germany, yet we have our fads. An \$800 machine would have destroyed those warts, though the writer believes that more skill to avoid scarring would have been required than that necessary in the use of a plain \$50 constant current outfit.

If a physician has any kind of constant current outfit and lacks the special needle holder employed in this work, an excellent substitute can be improvised in a few moments by selecting the smallest size of curved surgical needle (which should be used even if we have the needle holder), threading its eye with the end of a yard and a half piece of No. 32 cotton covered wire, and wrapping the needle and the end of a match stick together with the wire, thus forming a complete needle, holder, and conducting wire to the apparatus. A little hot wax will make the device of permanent value, covering the wire and the stick. The negative pole alone should be employed with such a needle, of course, with from one to five milliamperes of current.

This criticism is not directed against the employment of high frequency, high potential currents in the development of new applications and values, but merely against its thoughtless advocacy in the place of a physical method perfectly adapted to this work, more controllable in application, and requiring an inexpensive outfit.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

Sea Bathing in Gynecology. (L. M. Bossi, *Gazetta Degli Ospedali e delle Cliniche*, Milan.)

Like the majority of those who have given any attention to the scientific application of hydrotherapy in gynecology, Bossi has been much impressed with the therapeutic action of sea bathing in producing gynecologic effects, especially those of chronic endometritis, displacements with adhesions, defective puerperal involution, and chronic inflammations, anywhere in the genitalia. Sea bathing, like any form of hydrotherapy, should not be administered in a haphazard way, but under the strictest medical supervision.

Bossi believes that by utilizing, in a careful and scientific way, the medical thermal and physical measures, together with proper hygiene and sea bathing, that the physician can combat the abuse at present in existence of frequent mutilating operations. The editor has called attention (*Practical Hydrotherapy*) to the fact that most persons who seek the sea shore and sea bathing as a means of health getting, as a rule, stay too long in the water and over exert themselves in taking the baths. Here again the advice that Bossi gives that sea bathing should be a medical prescription is really very sound. The general results reached in his study of sea bathing in gynecology leads me to believe that it is one of the most effectual means of cure with which nature has endowed us.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M.D.

The Radio-Therapeutic Treatment of Fibroma of the Uterus: Its Efficiency, Indications, and Results. (By Dr. H. Bordier, Lyons. Archives of the Roentgen Ray, August, 1911.)

This interesting article, which is the author's first resumé of the subject, gives the details regarding the results which he considers remarkable. He states that after the second or third series of irradiations "patients suffering from fibromata see their hemorrhage come to an end at the same time as their periods, and the fibroma diminish progressively until it is no longer perceptible."

He speaks of the risk to the skin as being nil with the technique which he employs, and in his experience he finds there is likewise no risk to other organs. He states also that the symptoms of hysteria only occur for a few weeks after the establishment of the menopause when this measure is employed, though the internal secretion of the glands of the ovary are not diminished by the irradiations.

He states that fibromata twelve or twenty years old are but slightly atrophied by the treatment.

In the method employed by the writer the X-rays "produce the arrest of hemorrhage, of metrorrhagia, and of the periods, which do not reappear. For this reason the treatment is also applicable in hemorrhagic metritis, since after two or three series of irradiations—that is to say, in two months or so—the patient loses no more blood. The painful phenomena, where these exist, rapidly disappear even before the cessation of the periods."

Another remarkable effect to which he calls attention appears "some weeks after the end of the treatment," when one sees a return to health and a rejuvenescence, easily explicable by the suppression of the loss of blood, which in certain patients will attain an enormous volume, necessitating rest in bed for several days.

This improvement in the general condition begins during the course of the treatment, but it is more manifest afterward.

The writer bases his conclusions upon the treatment of eighteen cases which are cured. He states that not every fibroma of the uterus should be submitted to irradiation. Degenerative fibromyomata, fibromata with hydorrhea, and cystic fibromata do not justify radio-therapeutic treatment.

The author's method of dosage is the employment of the chromo-radiometer and an aluminum filter. By this method of measurement and filtration enormous quantities of irradiation may be employed without the risk of producing too

severe cutaneous reactions. The author's unit 1 is based on the weight of iodine liberated by the X-rays from a solution of iodoform in chloroform. The color changes in the platino-cyanide discs of the chromo-radiometer are standardized by comparison with this unit. He employs an exceedingly high water cooled tube, Nos. 11 and 12 Benoist.

Each series of treatments consists of nine irradiations, introduced by three different routes—through the two lateral regions and the median line.

Each of these surfaces thus receives three irradiations at intervals of two or three days. The dose of rays given each time is the maximum compatible with the integrity of the skin, about 5I, measured under the filter.

"As to technique. *The first day* I treat the two sides in succession, using a filter one millimetre in thickness. One of the sensitized pastilles is attached to the skin to be irradiated, and the focus tube is adjusted with its principal axis directed to the ovarian region, so that the divergent rays shall fall on the fibroma.

"*The second day*, the patient rests.

"*The third day*, medial irradiation with a filter $2/5$ millimetres thick, and with a dose of $1/5$ I to 2I, measured always by the tin of the sensitized plates.

"*The fourth day*, rest.

"*The fifth day*, the two sides are irradiated through a filter $1/5$ millimetres thick.

"*The sixth day*, rest.

"*The seventh day*, median irradiation with a filter 3 millimetres thick.

"*The eighth day*, rest.

"*The ninth day*, irradiation of the two sides with a filter 2 millimetres thick.

"*The tenth day*, rest.

"*The eleventh day*, a final median irradiation with a filter $3/8$ millimetres thick.

"By this series of irradiations, which represents six days of treatment, the fibroma and ovaries are submitted to a crossed fire of the X-rays, which leads to: 1. Atrophy of the more recent cells of the fibroma. 2. Atrophy of the Graafian follicles, but not of the entire ovary, as Reifferscheid, of Bonn, has shown by experiments on animals of larger size and also on the human subject."

These six radio-therapeutic seances, comprising in all nine irradiations, may be made without interval on six consecutive days. After the first series of irradiations, the patient rests for three weeks. The time should be so arranged that the menstrual period comes during this rest. A second similar irradiation is then given, and then again a wait of three weeks, followed by a third series, which is sometimes the last; but in

general a fourth, or even a fifth, may be given, according to the nature of the case.

When the patient returns after the first series no great change is observed. The skin is not reddened, the periods have not been nearly as severe nor so long as before, and the fibroma has hardly shrunk at all.

After the second raying the skin may show a distinct erythema or perhaps a brown tint. The losses have been less and the pains may have disappeared, or been much less, and the fibroma has begun to undergo a diminution in size. In occasional instances the period did not occur at all, and there was but slight discomfort. Some patients, after a second series, complain of a discharge lasting for some days or even weeks, but of a color less pronounced than the periods—a yellowish serous discharge. After the third series there will be a marked retrogression of the fibroma, without metrorrhagia, the patient begins to lose her characteristic color, her spirits improve, and a physical and moral regeneration occurs. The skin at this time may be red and usually desquamates. Occasionally nothing is observable save a brownish pigmentation, with some itching, which can be allayed by means of vaseline inunctions.

By continuing the irradiations a fourth and even a fifth time, we get a complete regression of the tumor.

"In conclusion, I will give my opinion as to the mechanism of the action of the X-rays in this treatment. Is the atrophy of the tumor the result of the precocious menopause produced by the X-rays, or is it due to a direct action of the rays on the cells of the fibroma?

"On first obtaining these successful results I was persuaded that the retrogression of the tumor was due to the suppression of the periods—*i. e.*, to the artificial menopause. Gradually, however, through the observations which I have had opportunity of making, my opinion has been modified, and I am now almost certain that the retrogression of the tumor is due in large measure to the direct action of the rays on the cells of the fibroma themselves. Many proofs of this can be furnished.

"1. In many of the cases I have seen the tumor sensibly diminish in size even before the stoppage of the periods. There are even some patients in whom the fibroma has almost entirely disappeared while the periods still continued.

"2. In one case, where only two series of irradiations had been given, followed by an interval of four months, the periods ceased after the second series, but the fibroma had preserved almost its initial size—that of a six months' foetus. When the seances were resumed the tumor began to retrogress until it was no longer perceptible on abdominal palpation, and was reduced to the size of an orange.

"3. I have on two occasions treated patients in whom the menopause was already established for several years and without losses, who had had a very large and troublesome fibroma, producing symptoms of vesical and venous compression. Under the influence of the X-ray irradiations there was in both these cases a very distinct diminution of the tumor and disappearance of the symptoms of compression.

"These are facts which prove that the direct action of the rays on the fibroma itself cannot be doubted. On the other hand, we know that the menopause by no means always produces atrophy of fibromata.

"As regards the action of the X-rays on the ovaries, and in particular on the Graafian follicles, it is sufficiently demonstrated by clinical observation. The recent work of Reifferscheid, who has been able to examine six ovaries of irradiated women, shows that there is produced 'a degeneration of the epithelium of the follicles, an atresia of the Graafian follicles over the whole extent of the anterior aspect of the ovary, and little capillary hemorrhages in the cortical layer.' These histological changes correspond with those noted since 1905 in the ovaries of animals by Bergonie and Tribondeau, in France, and by Halberstaedter, in Germany.

"The interesting point is that the internal secretion of the ovary does not appear to be modified. Women submitted to radio-therapeutic treatment have not the so-called 'flushes of heat' after the precociously established menopause, and those who experience them at first are free from them after a few weeks. This is a very interesting result and entirely in favor of this method."

He then gives the history of eighteen cases illustrative of the results.

This very valuable paper demonstrates what must eventually become the generally accepted idea of the importance and superiority of the X-ray in the treatment of fibroma over the surgical method. The method given by Dr. Bordier, however, is capable of a great deal of simplification in the matter of dosage. The dose that he employs is practically the usual dosage used by radio-therapists, but may be measured in terms stating the distance at which the tube is placed, the resistance of the tube measured by the parallel spark gap with terminal balls of a definite size, and the milliamperage of the current passing into the tube, and the number of minutes' exposure. We believe that such measurements are far more definite and less troublesome than the use of the chromo-radiometric pastilles of Saboraud or Bordier.—
[EDITOR.]

PHOTOTHERAPY AND DERMATOLOGY.

EDITED BY DR. HERBERT F. PITCHER.

Action of Ultra-Violet Rays on Tuberculin and on Antituberculous Serums. (The Lancet. From Archives of the Roentgen Ray.)

At a recent meeting of the Paris Biological Society, M. Jousset said that the experiments seemed to show that Koch's tuberculin was destroyed by prolonged exposure to ultra-violet rays. In reality the tuberculin was only rendered inactive; it lost its toxic powers, but retained the whole of its specific precipitating power with respect to the blood serum of immunized animals. This fact added another to the already existing proofs of the extraordinary power of tuberculin to resist destruction. On the other hand, antituberculous serums soon underwent important modifications under the influence of the same rays; the specific power disappeared in a few minutes, and in the course of some hours the serum became viscid and formed jelly. This was, in the opinion of M. Henry, a change common to many celloid bodies. Moreover, when the irritation was pushed a little further, serum which had been rendered colorless by dilution assumed a dirty yellow tinge similar to that of serum which had been left in diffused daylight for many years.

Radio-Activity. (By E. Stillman Bailey, A.M., M.D., Chicago, Ill. From the Journal of the American Institute of Homeopathy.)

The speaker describes radium and all other radio-active bodies, the radio-activity of spring waters, etc. He speaks more extensively of uranium and thorium, which, being combined, produce a compound which has been called thorode, which is simply a name coined in conformity with the national law requiring description of the medicament. He goes on to say that uranium and thorium are known to be radio-active. While it is not with radium that they are working, still the product contains radium. It is a potency of radium itself, and if cures result, they are radium cures. The report of three years of research and experimental work is condensed in this paper. The author and Dr. Frank N. Blackman, of Chicago, have used hundreds of pounds of high grade pitch blende ores, obtained for the most part from the mines of Colorado, in obtaining the radio-active substance. This has been made into a matte, film, or pad small enough to cover a wart or the size of a jacket covering the chest wall, the spinal column, or the pelvic cavity. This can be worn constantly, or at intervals, or by night only, or by day. It is easily applied, is

cleanly, and at an expense that is not prohibitive. The aluminum container, shaped like a suppository, is filled with the radio-active substance, the sizes being adapted for use in any of the orifices of the body. There are gelatine capsules which convey the cerate forms into sinus and the cavities with natural outlets. The radio-active waters or solutions are made by dissolving radium in water. The water is the recipient of the radio-active emanations, and can be made and kept radio-active even in the quantities needed for irrigations, as in eye diseases, sinus injections, along the line of painful scar tissue; for drinking purposes in gastric ulcers, etc. Radio-active triturate tablets are now a practical form of administering the remedy.

Drs. Bailey and Blackmarr have used those various radio-active substances for the past three years, and they think they have found a remedy of a high degree of efficiency in the treatment of selected cases. They claim entire freedom from danger in use, and a possible aid in many cases. The full therapeutic values are still to be determined. The author of the paper goes on to relate a series of experiments in a class of cases that might derive benefit from the uranium products. All forms of rheumatism, neuralgia, and neuritis, sinus disease and catarrhal affections of the respiratory tract. In Germany great attention is now being attached to the investigation of water laden with emanations of radium. In France, in addition to the above class of cases, stress is being put upon diseases of the nervous system, certain cutaneous and gynecological cases. Also, emphasis is being placed on the form of treatment by baths and mud. Wickham, of Paris, who has treated over 600 malignant diseases in the Paris Radium Institute, is quoted as saying: "If radium must not be considered a regular cure for cancer, it could be of real service to those suffering from this disease."

He refers to the reports of radium treatments by Sir Frederick Treves of malignant, tubercular, and innocent growths, particularly of the various nevi. The therapeutic action of radium is based upon its activity; in too massive emanations bad results are obtained; in the milder forms of treatment the radio-activity of the lesser dosage seems most justifiable. The author of the paper reports a series of cases in which he has used the radio-active product called thorode, preference being given to those cases where the result seems to be permanent cure, and cases now under treatment which point to ultimate cures. A case of so-called X-ray cancer of the finger and dermatitis, involving left hand and wrist, of eight years' duration, cured in five months. Another X-ray dermatitis of the thigh—a slough measuring ten by eight inches, extending almost to the bone, characterized by constant and intense pain, was treated. In forty-eight hours the pain was all gone,

never to return. Other severe cases of X-ray burns were reported cured. The radio-active substance used was in the form of a cerate or paste. He reports several malignant cases, all improved, some symptomatically cured. Three cases of lupus of the face cured. In all these cases the radio-active product was applied in a surgical dressing or a pad, or in the form of an ointment.

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERICK DEKRAFT.

A Symposium on Diathermy. (By Rantenberg, Muenchener Medizinische Wochenschrift, May 16, 1911.)

At the twenty-eighth German Congress for Internal Medicine, April 21, 1911, the author says that in a number of diseases of internal organs very good results can be obtained by diathermy. In heart disease with dropsy the latter was seen to disappear with profuse diuresis, while the heart, which had previously failed to respond to the action of digitalis, showed the physiological effects of the latter.

Attacks of angina pectoris become fewer and disappear. In bronchitis and broncho-pneumonia expectoration is markedly facilitated. Pleuritis is very favorably influenced, friction sounds extending over a remarkably large area during the treatment show the rapid absorption of the pleuritic exudate. The temperature of the parts between the electrodes can be raised to 40-41° C. The laryngeal mirror will show reddening of the vocal cords and there will be hoarseness of the voice after thermal penetration has been practiced for twenty minutes. Patients find the increased warmth extremely agreeable. When the kidney is diathermatized an enormous washing out of morphotic elements occurs, while the elements of a healthy kidney are unaffected.

Stein, of Wiesbaden, stated that the most important indications for the thermo-penetration were acute gonorrheal rheumatism, acute gout, and ordinary rheumatism. The tissues were sensitized to a greater degree to the action of radium emanations.

The treatment of the intra-abdominal organs is to be practiced with the greatest care.

Sohttenheim (Erlangen) says the general body temperature of a hound may be greatly elevated by one-half to one hour's exposure. In man the warmth is regulated by a more intense circulation of blood in the skin. He also found the blood pressure to be elevated instead of depressed.

Benmerke praised diathermy for gonorrheal rheumatism. Pleuritic murmurs appearing after the use of the remedy are attributed by him to direct heat injury of the serosæ. Reicher (Berlin) thought diathermy of the bone marrow should influence favorably certain blood diseases of myelogenous origin.

Warburg (Cologne) was skeptical. He saw no diminution in blood pressure nor better results in articular rheumatism than under other methods, but found good results in neuralgias.

Stein (Wiesbaden), speaking at the tenth congress of the German Orthopædic Society, April 17, 1911, says diathermy is a variation of high frequency current. Its characteristic effects are produced by utilizing only undamped oscillations. These undamped oscillations change their phase one million times per second. This current, in its passage through the body, heats the tissues, and with sufficient dosage may be made to destroy them.

The method is free from danger if appropriate apparatus and technique are employed.

The author has treated seventy cases of bone and joint diseases, and has obtained excellent results in acute gonorrheal rheumatism, in acute and chronic gout, in chronic articular rheumatism, and acute periostitis. Tuberculous inflammations of joints are not favorably influenced by this method.

Metcalf, in the *British Medical Journal*, reports eight cases of neurasthenia where, the usual methods of treatment having failed, the application of electricity produced good results.

The improvement and cure are effected by reason of certain physiological actions.

In cases in which the blood pressure is high, the effect of reduction of arterial tension may in itself produce the result.

The inhalation of ozone generated by the machine during the half hour after treatment may have some power of improving the patient's condition.

There occur increased tissue changes, more rapid reduction of the oxyhemoglobin in the blood, and increased elimination of waste products in the urine.

The sympathetic nerves controlling the vasomotor system, the secretions, the heat production, and the peristaltic functions are stimulated. There is profound action on the protoplasm of cells everywhere, increasing their chemical changes. Usually an increased amount of urea is excreted, attended by a disappearance of uric acid showing the oxidation of nitrogenous material. It is said that the output of CO₂ is sometimes increased from 17 to 37 litres an hour, and that there may be an increase in heat production from 79 to 127 calories an hour.

A Case of Papilloma of the Bladder Treated by Fulguration Through the Cystoscope. (By Drs. James N. Vander Veer and William G. Lewi. American Journal of Dermatology.)

The patient was a laborer, age 52, alcoholic, had myocarditis, greatly dilated stomach, a mild nephritis, some atheroma of the radial arteries, blood pressure 115. Prostate was normal in size. He was anemic as the result of the hæmaturia.

The cystoscope showed a papilloma the size of the thumb at the distal end, while at the proximal end the pedicle seemed to be the size of a lead pencil. Partly because tumors of the bladder in certain patients are inoperable, partly because the patient refused to have anything of major character done, and because, having heard Dr. G. L. Keyes report a case somewhat similar in character, where the Oudin current had been used with great success through the cystoscope, fulguration was decided upon.

The technique employed was as follows: A semi-rigid wire of special insulation, No. 6 in size, was introduced through a Bransford Lewis cystoscope. The cystoscope was lighted by a battery of dry cells. The patient was placed on a wooden table resting on rubber mats. The cystoscopist was insulated by sitting on a wooden chair standing upon two large rubber mats, and wore rubber gloves. This careful insulation became necessary because the object in this case was to deliver as much or as little current as was desired *to the end of the electrode*.

The bladder was filled with sterile water, as this seemed to be the poorest conductor. The cystoscopist brought the end of the electrode to within one-eighth or one-sixteenth of an inch of one of the villous protuberances and then gave word to the operator to turn on the current. The duration of the application was three seconds at first; later the applications extended over a period of ten seconds upon the papillary tits. It was found that the farther away from the bladder wall the application is delivered, the stronger can be the current and the longer can the application be made. A white eschar produced at the point of contact shows that the fulguration has succeeded. From five to fifteen points were burned out at each sitting. No pain was experienced except when the wire came against the bladder wall or the dose of the current was delivered against the same.

Twenty-five applications, at intervals of from three to ten days, were made. The tumor was destroyed to a considerable extent. The first application stopped all further bleeding. The patient left the hospital in the fore part of May, 1911, and has not returned since for treatment.

SOCIETY MEETINGS.

THE SEVENTY-NINTH ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

This meeting was held at Birmingham from July 25 to 28. The membership of this Association now numbers 24,000 members.

Perhaps the most interesting and original of the papers read was that by Professor Nagelschmidt, of Berlin, who has promised to attend the annual meeting of the American Electro-Therapeutic Association in 1912. His paper now dealt with "The Diathermic Treatment of Circulatory Disorders," and will be printed in full in a later number.

Dr. Knobel read a highly interesting paper entitled "The Differences in the Appearance of Phthisical Chests as Shown by X-Rays Before and After Open Air Treatment." It is a distinct advance in radiography to have a set of pictures showing the lung condition in several patients, taken before, during, and after treatment over a period of years. In his paper Dr. Knobel pointed out a valuable diagnostic sign of phthisis—namely, what he terms "*deficient illumination*." To obtain it the observer should remain in semi-obscurity for at least ten minutes, use a low tube, and pass through a current just sufficiently powerful to illuminate the chest. When the patient takes a deep inspiration the normal apex will brighten, but no such brightening occurs when there is said to be deficient illumination. Dr. Knobel states that this sign is always present in apical phthisis and exists often before the physical signs are distinct. It would appear that we have in this a valuable asset to our aid to diagnosis.

In the apparatus display Dr. Nagelschmidt showed a new condensation couch which resembled an ordinary condensation couch, but instead of having one rheophore ending in handles or a small plate, it is attached to a plate of the same size as is the plate under the couch. This plate is separated from the patient by a sheet of India rubber and the whole placed in a canvas envelope. With its use Dr. Nagelschmidt has passed as much as ten amperes through a patient.

Messrs. Siemens exhibited a 500 candle power lamp at a very reasonable price, and very compact apparatus for diathermy, which with an additional piece of apparatus, is capable of giving the high frequency current and operating an X-ray tube.

ELECTRO-THERAPEUTICS AND RADIOLOGY.

President: Hugh Walsham, M.D., London.

Vice-Presidents: Astley Vavasour Clarke, M.D., Leices-

ter; W. Deane Butcher, M.R.C.S., London; John Alfred Codd, M.D., Wolverhampton.

Honorary Secretaries: Franklin Emrys-Jones, L.M.S.S.A., 103 Newhall Street, Birmingham; George Harrison Orton, M.D., 67 Upper Berkeley Street, London, W.

Appended is a full list of the papers read before the electrotherapeutic section, with a synopsis of the more important ones:

Wednesday, July 26, 10 a.m. to 1 p.m.

President: Introductory remarks.

Sir Oliver Lodge: On the Conveyance of Electricity Through Solids, Liquids, and Gases, and the Production of Radiation.

Dr. Lewis-Jones: To open a discussion with demonstration on Ionic Medication and the Theory of Ions.

The following is an abstract of Dr. Lewis-Jones' paper:

As our knowledge progresses we begin to recognize that the effects of electricity on the human body fall into line as chemical or physical actions. The chemical are mainly ionic, the physical mainly thermal. The electric shock is due to the sudden displacement of ions in the nerve trunk or nerve endings. The sting of the constant current is due to the slow displacement of ions, and, indeed, the sensations of the constant current can be altered by altering the solutions with which the electrodes are moistened. An example of an ion whose penetration produces slight pain is the salicylic ion, while the ion of carbonic acid is one which causes severe pain at the electrode from which it is entering the skin. All this has been clearly established by the writings of Prof. S. Leduc. The vexed question of the absence of shock sensation when the large currents of the high frequency apparatus are used is also explicable upon the theory of ionic displacement. With the very brief impulses of high frequency the ions are displaced so slightly as to be incapable of stimulating the tissues; and it is important to note that d'Arsonval long ago showed that ordinary alternating dynamo currents produced less and less effect as their wave lengths were reduced, and he gave the figure of 30,000 per second as the speed at which sensation disappeared. It is probable that the wave length which is just too short to stimulate is not the same for all nerves; sensory effects seem to require rather longer waves than motor phenomena. With high frequency currents the ionic effects have disappeared, and nothing is left, that we know of, except the thermal effect. This may be the sole agent in producing the therapeutic results of high frequency, and, if so, leads us to hope that in the near future the employment of much more powerful apparatus and of larger

currents may give better results from high frequency applications.

Dr. Thurstan Holland: Calcareous Abdominal Glands.

Dr. Fred. Bailey: Fractures Undiagnosable Except on X-Ray Examination (illustrated by lantern slides).

Thursday, July 27, 10 a.m. to 1 p.m.

Sir Victor Horsley and Franklin Finzi: A Note on the Action of Filtered Radium Applied Directly to the Brain.

Mr. Deane Butcher: To open a discussion on the Therapeutics of Radium. The following among others have expressed a wish to join in the discussion: Dr. Dawson Turner, Dr. Sequeira, Dr. Abraham, Dr. Robert Knox, Dr. Finzi, Dr. Armstrong.

The following is a syllabus of Mr. Deane Butcher's paper:

The active agent, filtration, applicator, quantity; the action of radium irradiation on the nerve-endings in the suppression of pain and itching; the hæmostatic effect; the stimulation of epithelial growth and of fibrous tissue; action on rodent ulcer, on superficial epithelioma of the integument, warts, nævi, eczema, psoriasis; the introduction of radium into the cavity of new growths by Abbe's method; Harel's method of the electrical introduction of radium ions; the *rationale* of radium and X-ray irradiation; the theory of auto-immunization; radium in gynæcology and in diseases of the rectum, œsophagus, and bladder; the use of radium emanation; the replacement of radium by thorium.

Prof. Wertheim Salomonson: A Modified Form of Benoist's Penetrometer.

Dr. Reginald Morton: The X-Ray Treatment of Malignant Disease.

Dr. Ironside Bruce: Pyelography and the Use of Collargol in the Diagnosis of Diseases of the Urinary Tract.

Thursday, July 27, 2 p.m. to 3 p.m.

Mr. Wm. Armstrong: Radium Water Therapy.

Dr. Saubermann: Demonstration of the Latest Apparatus for the Making of Radio-Active Water, and Suitable Apparatus for Inhalation.

Friday, July 28, 10 a.m. to 1 p.m.

Mr. Hall-Edwards: Will open a discussion on the X-Ray Treatment of Ringworm.

The following is a syllabus of the paper with which Mr. Hall-Edwards will open the discussion:

The disease more common than generally accepted. Old methods of treatment lengthy and uncertain. The *pros* and *cons* of X-ray treatment. The best methods of applying the X-rays. Condition of tube most suitable for treatment. Measurement of the dose. Advantages of X-ray treatment. Dangers and how to avoid them. Treatment after epilation.

Dr. Nagelschmidt: The Diathermic Treatment of Circulatory Disorders. Demonstration: A New Condensator Couch.

Dr. Knobel: The Differences in the Appearance of Phthisical Chests, as Shown by X-Rays Before and After Open-Air Treatment.

Dr. Hernaman-Johnson: The Treatment of Certain Diseases of the Alimentary Tract by X-Rays, Combined with the Internal Administration of Metallic Silver.

Demonstration of a New Auto-Condensation Couch by Dr. Nagelschmidt, of Berlin.

I have just said that diathermic currents had only a local action. I wish to correct myself. At the third congress of Physico-Therapy, held in Paris in the month of April, 1910, I endeavored to show that high-frequency currents could not be applied without having diathermic effects, and that the whole action of high frequency currents is explained by their diathermic action. It is then no wonder that with the powerful modern diathermic apparatus one can therefore produce much more intense *general* applications of high frequency currents. I demonstrated in Paris that a ball of tin foil held in the closed hand was instantly heated by plunging the hand into a small solenoid excited by diathermic currents so much so that one had quickly to withdraw the hand. In the same way one can augment the action of the condensation couch to such a degree that one could not tolerate the holding of one pole with both hands as usually applied. We shall readily understand the action of the condensation couch if we employ one very big electrode on which the patient lies and which embraces the whole body. In this wise we have an action of high frequency currents over the whole surface of the body from one electrode. Until now it was usual to apply the other electrode as a handle electrode to both hands of the patient, and we were satisfied with this because the amount of current employed was never big enough to go beyond the toleration of the wrists. It must be understood that on the other electrode the current was of the same intensity, but owing to its large capacity the action was not perceptible. Now matters have changed. We have at our disposal a current of several amperes. The wrists could not support this amount of current even for a few seconds. So we are now obliged to find ways and means of applying to the patients

these more powerful diathermic currents by the condensation couch. There is an interesting phenomenon to be noted. If we apply to the patient two very large condensation electrodes having at our disposal a certain amount of volts, the condensation electrodes act (in spite of the insulated couch) like actual contact electrodes, and we get nearly as many amperes through the body as we would by the direct application of big metal plates. But big metal plates have the disadvantage that they must be applied directly to the naked skin of the patient very carefully and with good contact, which is very difficult on account of the contours of the body. On the other hand, big condensation electrodes can be easily applied to a fully dressed person lying on the usual condensation couch, especially if we connect the other pole (not to a simple metal handle), but to another very large condensing surface such as I show you here.

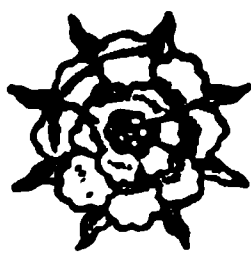
A large sheet of metal provided on its lower surface with a covering of thick India rubber having a safe margin is applied to the whole of the patient—that is from head to foot. This electrode is connected to the other pole of the instrument and is of sufficient capacity to permit of a current of five, six, or even 10 amperes. It must, therefore, be quite clear to you that we shall now produce totally different effects from those obtained formerly by currents which did not exceed 800 to 1000 milliamperes—the maximum current which the wrists can tolerate for some minutes.

It would take too much time to speak of the indications and results of the treatment by this powerful condensation couch, but I can affirm that it has a very marked influence on the general circulation, on the temperature of the whole body, on the nervous system, and especially in cases of sleeplessness.

*Siemens Brothers & Company, Limited, Caxton House,
Westminster.*

The combination principle in electro-therapeutics, which has already been demonstrated in various “universal” machines for conveying different forms of current in treatment, found quite a new and interesting application in the exhibit of Siemens Brothers & Company, Limited, Caxton House, Westminster, S.W. This took the form of an instrument called the *Oscillothermex*, combining diathermic, high frequency, X-ray treatment by oscillatory discharges of the electrical current. It is little more than a year since the apparatus for diathermy, or for sending great heat into the tissues without the risk of contact with the dangerous pressures of the supply circuit was brought out, and in the new arrangement it was shown linked up with a Tesla coil for high frequency work, and with an X-ray tube stand, the cathode of the tube

being connected with the upper end of the coil. From the point of view of X-ray theory, as well as of practice, the apparatus had an interest, since it represented perhaps the first really successful establishment of electrical oscillations as a means of working X-ray tubes. We understand that the Wien method of quenched sparks, used in the Telefunken wireless telegraphy system, has made this possible. The tube is intended primarily for X-ray therapy, but screen work of a simple kind can be carried out. As to the high frequency function of the apparatus, this, it is claimed, has an advantage over the more ordinary form, because not only is a strictly asymmetrical wave of alternating current employed, but an increased effect is brought about owing to the larger number of sparks which are produced. The Oscillothermex can be connected directly to the alternating current supply, or, through a small rotary converter, to a supply of direct current. Other exhibits at this stand included the newest patterns respectively of an induction coil for instantaneous radiography, a universal apparatus for electro-medical purposes, and a switch table. There were also on view the *Skiafix* for X-ray localization, which we noticed at the last exhibition, a set of dental instruments made of tantalum, and a display of radium salts and radio-active earths, with applicators and other requisites for radium therapy. Messrs. Siemens also exhibited, under the name of Kontrastin, a substitute for bismuth in the form of zirconium oxide. This ural test meal drug is said to be much more opaque than bismuth carbonate for X-ray purposes, to be unaffected by acid, and to have no injurious action on the system.



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THE OPERATION FOR PROSTATECTOMY.

The operation for the removal of the prostate gland, is acknowledged by its most ardent advocates to be only a partial success in the majority of cases. Medical literature contains frequent references by surgeons to the value of a second operation for removal of defects following the first operation; and also frequent admissions of the common failure to leave complete competence, the excuse being, that the condition of the bladder at the time of the operation owing to prolonged distension, precludes the possibility of complete restoration. This is true, but will not account for the incontinence in numerous cases in which that condition did not exist prior to the operation.

There would seem to be little or no justification for any operative procedure except in extreme emergencies, until safer methods which have proved almost universally successful have first been tried. It is true that the surgeons, many of them, are not aware that there is any method other than theirs, of treating these cases. This, however, is not because the methods have not been frequently reported and published, but because they may have been inclined to ignore or discredit the reports of other methods than surgery.

There is very little satisfaction in surgical operations in cases of malignant prostate; because a recurrence is almost a foregone conclusion; and in most cases these patients succumb

and die sooner than they would if no operation had been performed; and furthermore, their condition is not rendered more comfortable after the operation. In these the Roentgen ray or radium undoubtedly prolongs life and renders the patient more comfortable than an operation would.

In fibroma of the prostate there is undoubtedly as much to be derived from the systematic use of the Roentgen ray as in the treatment of uterine fibroids, in which it is acknowledged by all candid observers who are familiar with other methods, to be the most practical method. These fibroids can, in most cases, be reduced so much as to remove the obstructive features.

In the treatment of the infiltrated cases, which are massaged frequently and for a long time, it has been the statement generally by physicians who have submitted to this operation, that it does not remove the infiltration, but the normal glandular secretion; and very often the condition is aggravated instead of being improved by the procedure. In infiltrated cases the static wave current invariably succeeds; and in senile hypertrophy there is no contra-indication whatever for its employment as in the large majority of instances these are cases of chronic infiltration. Furthermore, there is no age limit at which prostatic infiltration occurs; and instead of being considered an affection of old age, it should be attributed at this time of life to the inconveniences that develop with age in neglected cases.

It would seem, therefore, that surgery should never be employed in prostatitis except in extreme cases or in case of emergency. The present drift of sentiment is in this direction, and the time is not distant when this conviction must become dominant.

PROFESSIONAL FEARS OF THE ROENTGEN RAY.

The prevalent notion in the mind of the physician who is not familiar with the Roentgen ray is to disparage its use, or to dread to have it employed upon his family or patients. The reason for this is undoubtedly to be explained by the fact that so many physicians have used it, without any knowledge of the dosage and the consequences, and have caused so many unfortunate conditions of severe dermatitis, that general

condemnation has been brought upon this valuable diagnostic and therapeutic means.

A large number of radiographers who began the use of the x-ray early in the last decade, were extremely careless—unnecessarily exposing themselves. Several of these have died from the effects of degenerative changes set up in the tissues, and others have become so frightened, that they have gone to the extent of employing extreme caution. This is quite natural, and a wise course for them to pursue; but sometimes unfortunate in that it has added often to the fears of the patient, and increased the timidity of the young operator; who, while he should always be warned, is not obliged to take anything like the precautions of the man who has sustained bad effects from the results of early imprudence in its use. There are many who have used the ray from the first, but with an exercise of prudence have sustained no ill effects.

The men who are most in danger from the ray are those who take radiographs constantly in connection with large hospital service, and may be exposed to the intense irradiations employed in this class of work. Provisions are usually made now in hospitals and where much radiography is to be done, to shield the operator from the ray when these short exposures are made, which reduces the risk to a minimum.

In radiotherapy where long exposures are made with x-rays of low intensity, it should not be necessary for the operator to exhibit any special fear in the treatment of his patients; because he is only exposed while starting the ray, and in any event if ten or fifteen feet away, is relatively safe, even if no shield is used; the modern apparatus, however, provides a thick-lead glass shield around the tube that almost completely protects the operator from any risk whatever, as well as protecting the other parts of the patient, and other persons in the room with the patient.

The present knowledge of the counter action of radiant light and heat as neutralizing the effects of the x-ray, removes practically all danger from its employment in therapeutics; for, whenever a dermatitis occurs it may be practically controlled by the employment of radiant light and heat.

Under these conditions, the Roentgen ray should be placed in an absolutely uncompromising position before the profession and public. The valuable services that it is now possible

to perform with this important therapeutic and diagnostic measure are rendered absolutely free from objection in the hands of those who know what should be known, and deign to use it because they do know, as they should every therapeutic measure they employ.

DANGER OF FORCED FEEDING OF TUBERCULAR PATIENTS.

Auto-intoxication is among the most common causes of tuberculosis, when we take into account the habits of the average individual who is disposed to eat much and exercise little. It will be readily seen that if patients have lowered their resistance in this manner, there can be no greater mistake made than to adopt as a part of the treatment, the very same program which had led to their unfortunate condition; and yet this is a too common practice by physicians in the treatment of tubercular patients.

Tuberculosis should be treated as a *symptom complex* with every attention given to discover and correct the cause or causes which must have been productive of the lowered resistance which permitted the invasion of the tubercle bacilli. It is well recognized that no healthy individual with normal resistance can become subject to tuberculosis. The diet should be studied from the point of view of the maximum possible absorption, consistent with the conditions of the digestive functions in each individual case; and the irrational practice of forced feeding should be forever abandoned; for it will be observed in most cases that patients who are put upon properly restricted diets will rapidly gain in weight, whereas, under forced feeding, they will become constipated and feel heavy and dull with throbbing arteries and sleepless nights, and with many there will be a marked abnormal rise in arterial tension.

THE TWENTY-FIRST ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

The session of the American Electro-Therapeutic Association at the College of Physicians in Philadelphia, on the 5th,

6th and 7th of September, 1911, was one of the most profitable in the history of the Association. The scientific character of the Committee reports and papers, denote remarkable developments and progress in physical therapeutics.

The address of the President, which is published in this issue comprises a complete history of the development of electro-therapeutics. This paper should be read by all who are interested or apt to become interested in the future in the uses of electricity.

The committee reports, also published in this number, were exceptionally complete, denoting the progress and development of physical therapeutics.

The attendance and interest manifested in the sessions, and the earnestness of the discussions, marked also the attitude of this Association in the promulgation and correct conception of the department of therapeutics for which it stands.

The entertainment of the Association by the Philadelphia members, particularly of the management and staff of the Oncologic Hospital, at which a collation was spread for the members, will be long remembered by those who attended this session.

In the afternoon of Thursday, his Honor, the Mayor of Philadelphia, granted to the members of the Association the use of a city yacht, in which the members and their wives were given a sail past the shipyards and navy yards of the city. This was enjoyed by all who were able to avail themselves of the opportunity.

The following officers were elected for the ensuing year. President, Dr. Herbert D. McFee, Haverhill, Mass.; First Vice-President, Dr. F. Howard Humphris, London, Eng.; Second Vice-President, Dr. George E. Pfahler, Philadelphia, Pa.; Secretary, Dr. J. Willard Travell, New York; Treasurer, Dr. Emil Heuel, New York; Registrar, Dr. Frederick M. Law, New York, and members of the Board of Trustees, Drs. Frederick DeKraft, and Francis B. Bishop, for three years.

The report of the Secretary and Treasurer shows a surplus of more than \$1,000 in the treasury.

THE DEVELOPMENT OF HIGH POTENTIAL CURRENTS AS APPLIED TO MEDICAL USES.*

FREDERICK DE KRAFT, M.D., NEW YORK.

There are few subjects in medicine more fascinating than a review of the labors and methods of study and experiments of the men who have made possible our present knowledge of high potential currents.

Scriborius Largus, a physician practicing in Rome at the time of Tiberius, taught the use of the Raja torpedo in the treatment of old and otherwise incurable headaches and rheumatic affections. The torpedo was bound daily to the affected part for a short time, with resulting cure in many intractable conditions.

The Greeks knew of the numbing effects of repeated shocks from electrical fishes. They called it the torpedo narké, hence the word "Narcotica."

Galen also recommended this method. The inhabitants of Africa, especially in Abyssinia, have bathed their sick in waters where these electrical fishes lived since time immemorial. A study of the electrical organs of the different electrical fishes, while interesting, would serve no useful purpose in our present subject.

The pioneer discoverer of the electric power of amber was Thales, who was born 641 B.C. Thales had electrified the amber (electron) by rubbing it, had discovered the means whereby man could rouse a powerful force wherewith to do mighty things. He had opened the door through which he might have seen the wonders and the glories of a later day.

Wilhelm Gilbert, the physician of Queen Elizabeth of England, found that not only amber and lyncurium, but also the diamond, sapphire, rock crystal, sulphur, resin, and sealing wax acquired the power of attracting when rubbed briskly against the clothing, light bodies, such as straw or feathers. He called such substances *ideoelectrics*.

Priestley names Gilbert "the father of electricity." Cavallo says in the third edition of his book, "A Complete Treatise of

*President's Address. Read before the Twenty-first Annual Meeting of the American Electro-Therapeutic Association, September 5, 1911, at the College of Physicians, Philadelphia, Pa.

Electricity in Theory and Practice, with Original Experiments," published in 1786, on page 20:

"After Gilbert, the science advancing, although by small degrees, passed, as it were, from infancy to puerility; many an excellent philosopher undertaking to examine nature in this walk; such was Sir Francis Bacon, Mr. Boyle, Otto Guericke, Sir Isaac Newton, and most of all, Mr. Hawkesbee, a person to whom we are much indebted for many important discoveries, and a real advancement of electricity. Mr. Hawkesbee was the first who observed the great electric power of glass, a substance that, since his time, has been generally used by all electricians in preference to any other electric. He first remarked various appearances of the electric light and the noise accompanied with it, together with a variety of phenomena relating to electric attraction and repulsion.

"After Mr. Hawkesbee, the science of electricity, however hitherto advanced, remained for about twenty years in a state of quiescence, the attention of philosophers being at that time engaged in other philosophical subjects, which, on account of the new discoveries of the incomparable Sir Isaac Newton, were then greatly in repute. Mr. Grey was the first, after this period of oblivion, to bring the science again to light. He, by his great discoveries, reintroduced it to the acquaintance of philosophers, and from him the true flourishing era of electricity may be said to take its date."

The frictional electrical machine was discovered in 1670 by the burgomaster of Magdeburg, Otto v. Guericke.

Nothing contributed to make electricity the subject of public attention, and excite a general curiosity, until the capital discovery of the vast accumulation of power in what is commonly called the Leyden jar, in 1745 by Von Kleist, dean of the Cathedral in Comin.

Jallabert, professor of experimental philosophy in Geneva (Genf), published a book, "*Experimenta electrica usibus medica applicata*." This book appeared in German in Basel in 1750, in twelve chapters. It contained several histories of patients, also letters received from Sauvages, professor of therapy in the University of Montpellier, physician to the Count of Hussia-Darmstadt. Dr. P. Ladame, "*Notice historique sur l'électro-thérapie*," Geneva, 1885, has succeeded in finding Jallabert's manuscripts and drawings in the library of

the University of Geneva. Jallabert utilized the high potential electrical currents of the frictional electrical machine for the local treatment of disorders of the nervous and muscular systems with success.

Jallabert noticed an increase in the pulse rate (from 80 to 90—even 96) in persons receiving static electricity. He studied the effect of electricity on the human temperature; he found a thermometer placed under his axilla rose from 92° to 97° Fahr. while he received the static charge. Priestley and Didier Placé observed a similar rise. Jallabert found the electro-static "bath" a valuable agent against amenorrhœa. He noticed increased secretion of sweat and urine.

Persons who were being bled while receiving a static charge showed a higher rise in the blood stream. Interruption of the current caused a fall of the stream.

Jallabert also says: "An effect of the electricity which deserves special mention is that every muscle makes a convulsive movement when an electric spark strikes it." He observed that according as he sparked the flexor or extensor muscles, they obeyed his command, though they were paralyzed and bereft of every voluntary movement.

Of special interest is the history of his patient Noques, a 50 year old locksmith, whose right arm and leg were paralyzed, emaciated, and anæsthetic. Static sparks were applied from January 5, 1747, till February 28, 1747, with the result of increase in the circumference of arm and leg and such improvement in muscular power that the man resumed his work again. Abbé Nollet reports that Noques relapsed into his former condition soon after his reported cure.

Nevertheless, this appears to have been the first attempt to apply electricity scientifically for its local effect. Professor Guiot (professor of anatomy and surgery, and the head surgeon at the hospital in Geneva) reported this case to the faculty in four communications, wherein he substantiated Jallabert's observations.

At this time Professor Hansen, of Leipsic, Gordon (Efurt), Bose C. Wittenberg, and Johan Heinrich Winkler, professor of physics in Leipsic, became an advocate of electricity. Professor Winkler introduced friction cushions to take the place of the hand for producing friction on the sulphur ball and glass cylinders. Ramsden substituted glass discs in place of

the glass cylinders. Van Marum improved on this and succeeded in building machines of great power, which were capable of producing thick, heavy sparks 25 inches long. While Jallabert utilized very weak currents, others used very strong sparks with detriment to their patients. This fact led Abbé Nollet, Antoine Louis, and others to oppose the use of electricity. About this time great numbers of people flocked to Montpellier, where Sauvages relieved so many of their ailments that, the multitude of people becoming very great, the physicians appealed to the priests to protect them from witchcraft.

Leyden jar shocks were much in vogue. It soon became known that it was necessary to regulate the intensity of the shock by utilizing jars of different sizes. In this way Lane's electrometer was invented. It was found that a Leyden jar could be discharged slowly when the resistance of the air was interposed.

The instrument consists of an ordinary Leyden jar, a small movable rod with a ball at the end (this rod being supported by a bent glass tube from the top of the jar) which could be moved toward the rod leading to the interior of the jar. The manner of using it was: The patient was connected to the outer coating of the jar by one electrode; another electrode resting on the part to be shocked, was attached to the movable rod. According to the spark gap between the metal ball on the rod and the rod leading to the interior coating the severity of the shock varied. Thus a fairly accurate dosage could be given.

Cavallo recites many interesting experiments with Leyden jars and batteries of jars. The ancients fused metals with these, ignited gunpowder and various inflammable fluids, etc. Cavallo also speaks of the electric light in vacuo, of "the electric fluid coming from a wooden point," our modern brush discharge. This interesting work was published in 1786 in two volumes. It is well worthy of perusal by the modern student of electricity. As these pioneers had no previous knowledge of the subject, their manner of making experiments and deductions helps to fix many basic principles in the reader's mind.

The interest in electricity was very wide at this time. Dozens of men, whose names we could not mention on account

of lack of space, devoted their best energies to its scientific study.

Soon, however, unscrupulous men took to "shocking" and "electrifying" people by wholesale. This and the exaggerated claims made by many brought the remedy into disrepute.

The discovery of the voltaic pile by Volta in 1800, and induced current by Franklin in 1832, directed the professional mind in these directions.

It is probable that the severe Leyden jar shocks resulted in much harm to the patients, as well as to the cause of electro-therapeutics.

Mr. Stephen Grey, a pensioner of the Charter House, impelled by enthusiasm, conducted experimental researches which led to the discovery in 1730 of two classes of electricity (electrics and nonelectrics), the latter acquiring electricity by contact with the former when excited by friction. He discovered the insulating property of silk, resin, glass, hair, etc., and the fact though not the principle of induction.

To Dufaye belongs the honor of the discovery of the existence of the two opposite electricities. He showed that bodies having the same kind of electricity repel each other, but attract bodies charged with electricity of the other kind.

Franklin first directed his attention to electricity in consequence of a communication from Peter Collinson to the Literary Society of Philadelphia in 1747. His experiments and observations were embodied in a series of letters which were afterward published and were widely read and admired in Europe.

Franklin's opinion of the nature of electricity differed from that of Dufaye. He said: "All bodies in their natural state are charged with a certain quantity of electricity, in each body this quantity being a definite amount, which is maintained in equilibrium upon the body by an attraction which the particles of the body have for it. A body may be invested with more or less electricity than satisfies its attraction.

A body having more than its natural quantity of electricity is positively charged; one having less is electrified negatively. One electrical fluid only was supposed to exist. Electrical excess is the vitreous, electrical deficiency, the resinous of Dufaye.

Franklin also discovered the identity of lightning and electricity. His experiments with the kite, etc., on the commons of Philadelphia are well known now.

Franklin's discovery of induction led to its study mathematically by Oepinus and Cavendish. Conlomb's studies with his torsion electrical balance established the fact: 1. That attraction and repulsion vary inversely as the square of their distances. 2. That excited bodies, when insulated, gradually lose their electricity because the surrounding atmosphere is never free from conducting particles and because of the inability of the best of insulating medium to retain the entire charge, there being no substance entirely impervious to electricity. 3. The entire accumulation of an electrical charge is deposited on the surface; none penetrates the interior. A hollow sphere contains as much electricity as a solid one of the same size. "Hence, accumulation is not a consequence of attraction for mass of matter, but on the contrary is solely due to its repulsive action."

With the discovery of the Holtz machine in 1865, and the Toeppler-Holtz machine also about the same time, some interest was again aroused in static electricity through the efforts of Schwanda in 1868; many cases were treated by him in the electro-therapeutic department of the Vienna General Hospital. He reported some cases which were treated successfully in *Wiener Med. Jahrbucher*, 1868, but contributed nothing new. Not until Charcot began to employ static electricity at the Saltpetrière was any real interest shown by scientific men (1879). It was at Charcot's clinic in 1880 that Dr. W. J. Morton first studied the subject of medical statical electricity. Becoming convinced of its therapeutic value, he brought home machines and electrodes and introduced the subject—general electro-static administration—to the profession in this country in a formal paper read before the New York Academy of Medicine, March 3, 1881.

This memorable paper, entitled "On Statical Electro-Therapeutics, or Treatment of Disease by Franklinism," was published in the *Medical Record*, April 12, 1881. In it was described as "the static induced current." He says: "I venture now to add a fourth method, that of the induced current produced by static electricity and capable, like the currents induced by magnets and the voltaic circuit, of causing physiological tetanus."

"Taking the Holtz machine as it stands, the change may be quickly effected. We remove the connecting bar between the

two outer coatings of our Leyden jars, connect ordinary conducting wires and wet sponge electrodes to each outer coating respectively, and finally connect the two inner coatings by the discharging rod. The patient, of course, need not now be insulated. As soon as the machine is set in motion and the condensers are filled the discharging rod may be drawn out a small fraction of an inch, and at once a current is felt between the two sponge electrodes.

"Owing to its very high tension, however, it is necessary to have the handles of the electrodes well insulated and free from metal points in order to avoid the fine prickling sparks which pass into the hands of the operator. It is soft and agreeable and accompanied by no shock. This current is not to be confounded with the series of discharges taking place between the inner coatings of the jars. This latter, in silent current forms, produce no muscular contractions or sensations of any kind. In slight repeated discharges it is too painful to be borne. A superficial trial shows one difference in favor of the static induced as compared with the galvano or magneto-induced current. The static induced both produces more efficient contraction and gives less pain to the patient, where pain would be produced by any of the three. With it the whole motor apparatus of the body may be called in action at its several points, nerves stimulated, and other effects produced, just as with faradism. The current may be regulated to a nicety by means of the discharging rod, ranging from an almost imperceptible tingle up to extreme and rigid flexion of the arms, should, for instance, the electrodes be held in the hands.

"This, then, is an entirely new current in medicine, and it is not a little curious that with all the experience with frictional machines it should have remained undiscovered up to the present day."

This new current did not attract the widespread attention at the time which it merited.

The oscillator described by Hertz in 1887 for propagating a high frequency current along a wire utilizes practically the same principle described by Morton as "induced current." In June, 1887, Ranney published a paper on "Static Electricity" in the *Physician and Surgeon*, Ann Arbor. After speaking of the induced current he says: "He (Morton) has

also been experimenting of late upon the effects of deriving currents for medical purposes from a helix of insulated wire wound upon each of the Leyden jars of a Holtz induction machine.

This antedated Hertz's method also by several months. Sir Oliver Lodge described an arrangement identical with Morton's induced current in 1888. He calls the spark between the exploders, from the inside of the Leyden jars the "A" spark and the one obtained from the external coating of the two jars the "B" spark. He says: "The 'A' spark is always much more dangerous than the 'B.' Why? Both are oscillatory, but in the 'A' spark you have a rush of electricity in one direction, and that is what produces the deleterious effect. I don't know whether it electrolyses the tissues or what, but it is certainly dangerous. But when you send the electricity by the 'B' circuit you start and stop at zero. Everything is quiet until the rush occurs. It is perfectly neutral until the rush occurs, which is precipitated by the 'A,' and then the oscillations go backward and forward, and then all become neutral again. There is no rush in one direction—the plus and minus being practically equal; whereas the 'A' oscillatory discharge has the plus in excess in one direction, and if it is strong enough will kill you. The other, however strong, is hardly felt. It is a very remarkable thing that these oscillations—in this case about 1,000,000 per second, rather more (about 20,000,000) in the case of those fast discharges—should have no perceptible effect. . . . And yet there is a very fair amount of current passing."

In a communication to the New York Neurological Society, December 2, 1890, Dr. Morton, speaking of the pain annulling effect of the induced static current, he says: "The motor effect, including the circulatory, cannot be denied." Perhaps the extraordinary frequency of the alternations of the current per second may explain it. These alternations, it will be remembered, I computed might easily amount to 20,000,000,000 per second. My own view is that the great frequency, the fineness, so to speak, of the electric vibrations, which we know as a matter of fact are set up in the nerve filaments, interferes with and annuls the pain impulse." . . . "The experiments of Mortimer Granville with his percuteur taught us the benumbing influence upon painful nerves of even coarse vibrations.

With alternating electric impulses of 20,000,000,000 per second, more or less, we may find explanation of the analgesic effect of the Franklinic interrupted current."

On February 24 and 25, 1891, Professor D'Arsonval communicated to the Society of Biology his method where he utilized the static induced current, interposing, however, a solenoid of stout copper wire in "B" circuit of Lodge. His experiments and deductions were published in 1894 and have ever since attracted great attention. Then came Tesla's lecture, May 20, 1891. He utilized the inductive effect of the D'Arsonval's spiral in producing currents of higher potential and frequency in a fine wire secondary circuit. Next came Oudin's work. He added a spiral to one end of the D'Arsonval while the other end was grounded. As the result of the reports of these men, high frequency currents began to be used everywhere, the literature became full of glowing reports of cures and of claims which, in the light of our present day, are considered questionable.

However, we owe much to D'Arsonval currents in the relief of hypertension, in the intensification of the circulation (hyperæmia) when used strictly for its local effect, and its very decided action in furthering nutritional changes.

However, it would take too much time to recount all of the possibilities of high frequency currents. The committee reports of the last few years, Dr. Clark's paper on oscillatory desiccation of benign and malignant growths, Dr. Titus's paper of two years ago, are all familiar to you and contain practically all our present knowledge on this important subject.

But we must not forget our static machine. The first of the present type of Holtz machines (with split plates) were made by Wimshurst in 1878 in Germany, and by Rosseau in 1884 in New York. Dr. Morton and others recognized early the importance of using a current possessing a minimum of amperage and a maximum of potential.

This desideratum is fulfilled by the type of static machine just described. The Wimshurst Sector machine and the Toeppler Holtz give a spark of greater amperage. In regard to the action of static sparks, Dr. Morton says very appropriately in his paper of 1881: "The spark is due simply to the equalization of the patient's and the earth's potential, and represents a very brief but violent current." The spark strikes

a sharp, incisive, and penetrating, though scarcely painful blow, and often repeated in a given region creates, by simple disturbance, a great alteration in the nutrition of the part."

Up to the year 1880 no one had ever thought of producing a current by this spark, nor of taking away to some extent the sting of the striking blow of the spark. To this end, Dr. Morton described and made use of his pistol electrode in 1880.

The spark director of Snow fulfills a similar mission to-day.

The static wave current was practiced by Dr. Morton for several years and was published at the solicitation of Dr. William Benham Snow in 1899, and again on April 21, 1900, in the *Medical Record*. Dr. Snow recognized the great therapeutic value of the wave current in 1898 in relieving spasm, in softening inflamed and swollen tissues through removal of local stasis. We owe much to his untiring efforts in obtaining our present knowledge of the wave current.

The committee reports (of this Association) on static electricity, Dr. Snow's book on "Electro-Static Modes of Application and Therapeutics," and his latest book on "High Potential and High Frequency Currents," contain all that is known on the wave current. His description of the static spark and the Brush discharge explain why they are effective and cure "above and beyond other forms of electricity" in their proper field.

This Association has now existed twenty-one years. It was the first electro-therapeutic society which was ever formed. After its model all others were founded. During the time of its existence nearly all the great progress which our knowledge of high potential currents has made has occurred.

Its influence in this development has been widespread. What will the future bring us in the way of advancement? We can see greater possibilities in high potential currents in alleviating pain, prolonging useful lives, adding to the buoyancy of spirit so necessary in creating that youthful enthusiasm which makes research possible and, as a consequence of this, advancement in the sciences, the arts, and commercial fields of endeavor.

Discussion.

Dr. Francis H. Humphris, of London, England: The President's address is above discussion, fortunately, for few of us could rise to such historical heights, but I wish to move a vote of thanks to our President for the exhaustive sketch of high frequency currents, a model of erudition, which he has given in so masterly a manner. Adopted.

THE X-RAY IN MALIGNANT DISEASES OF THE BREAST.*

BY J. N. SCOTT, M.D., KANSAS CITY, MO.

In the treatment of malignant diseases of the breast the first problem to solve is the diagnosis, if possible. It is conceded that 80 per cent. of all tumors of the breast, not including acute infections, abscesses, etc., but distinct tumors, which have been present for some time, are malignant, and that 10 per cent. of those which are not malignant at the time of examination become so at some later date. In advanced cases in which one or all of the following symptoms are present, tugging of the skin, retraction of the nipple, and glandular involvement, it is easy to make a diagnosis. In any case of enlargement of the breast without the classical signs of a malignant disease, abscess or infection must be excluded. This can always be done by waiting a week or so. I do not want to be understood as saying that all tumors of the breast, without positive symptoms of their being malignant, are such, but the per cent. being so large when there is doubt, it is better to err on the side of its being malignant than the other.

After the diagnosis the next problem to be solved is the treatment. The treatment of these cases with plaster, caustics, etc., is not to be considered, as they do not compare in per cent. of cures to surgery, mercury, zinc, cataphoresis, or the X-ray. In surgery, if it is possible the malignant cells can be removed, there will be a positive cure, but in what per cent. of cases can this be accomplished? The surgeon says, if the glands in the axilla are not enlarged sufficiently to be made out by palpation, they should be considered enlarged and removed. In a case of this kind, when the glands in the axilla are not perceptibly enlarged, the chances of a cure by radical operation are splendid. But the per cent. of the cases which have made up their minds to be operated on, which have not enlargement of the axilla glands, is small, and the great majority have these glands enlarged, also the glands in the neck. Now, if it is reasonable to suppose that when the glands in the axilla are not sufficiently enlarged that they

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can be made out by palpation, that they are considered malignant, then when they are perceptibly enlarged is it not reasonable to suppose that the glands in the neck are involved, whether the involvement is apparent or not? In case they are involved, it is almost impossible for the surgeon to remove all that are involved, and the per cent. of these cases which are cured by surgery is extremely small.

Good results are being reported in the treatment of many cases by the Massey method of zinc-mercury-cataphoresis. The surgeon to-day says: "Give the Roentgenologist those cases which are inoperable. Make him the dumping ground for cases in which there is no hope by other methods." For this reason the cases treated by the Roentgenologist generally have not been favorable cases, but are those which are far advanced, and if he cures even a very small per cent. of these cases, which he undoubtedly does, he is doing a good work. Now, if the X-ray is indicated and does destroy some of the apparently hopeless cases, why is it not also indicated in the more favorable cases? I undoubtedly believe that it is.

The neoplasm, when situated in the breast, is generally easy of access. It is not covered by so much tissue but what a therapeutic dose of the ray can be delivered to it without destroying the overlying tissues, and we have the great advantage in treating with the ray in that we can apply it to all suspected avenues of extension. In the last ten years I have received for treatment 242 cases of malignant disease of the breast, including both primary and post-operative cases. Nine per cent. of these cases quit treatments at or before four weeks. Some were hopeless; others became discouraged, etc. Twenty-two per cent. of the cases were post-operative, with a return either in the breast or glands. Of these cases, 31 per cent. of those which I was able to keep track of for one year after discharge were well. Of the remaining cases, 57 per cent. of those I was able to keep track of for one year after discharge were well.

In the treatment of these cases the enlargement either in the breast or the glands does not entirely disappear. The X-ray will not destroy the fibrous structure of these glands, and if a surgeon should examine many of these cases some time after treatment, and did not know that they had been treated with the X-ray, he would immediately make a diag-

nosis of a malignant disease, because in cases in which there was a tumor in the breast and enlarged glands in the axilla considerable of this enlargement would remain, and it would appear like a typical case of malignant disease even after treatment.

I treat these cases as long as the tumor and glands continue to diminish. When they have ceased to diminish for from three to four weeks, I cease treatment and keep the patient under observation as long as it is possible. I first have them come back for examination in a month, then in three months, and gradually increase the time between each examinations until I have kept them under observation, if possible, for three years, but I always caution them if they go to a strange physician for examination, to tell them the circumstances, that is, that they have been treated with the X-ray, and that the enlargements were there when they ceased using the ray, and that it is now a question as to whether these places are getting larger or not. I believe when a larger per cent. of the so-called "favorable cases" are treated with the X-ray that much greater per cent. of cures will be recorded.

It was not so very long ago that the dermatologists did not use the X-ray in treatment of epithelioma of the face. Now you seldom find a dermatologist who does not have an X-ray equipment and treats the cases himself, or refers them to some one who does. They acknowledge that it is the treatment for these cases. In the treatment of these cases I use a tube with sufficient penetration to be sure and get plenty of the ray through the tumor. I use a medium hard tube so as to have as few non-penetrating rays, and those which especially affect the skin as possible. I never apply the ray intentionally strong enough to break down the healthy structures more rapidly than they repair. Unless the patient is very sensitive to the ray I make a daily application. I always keep a record of the amount of current used in the primary coil, the length of the parallel spark gap, the length of the series spark gap, and the number of milliamperes passing through the secondaries.

As to the use of the ray after operation, I believe that it should be used in all cases which have been operated on and proved, by microscopical examination, to be malignant, whether or not the surgeon believes he has obtained all of the growth. This is too serious a condition to take any chances, and undoubtedly a much larger per cent. of the cases will recover if three or four weeks of raying is used after the operation. It will do no harm, and, if anything, will stimulate the healing of the wound.

SOME OF THE THERAPEUTICAL INDICATIONS
OF HIGH FREQUENCY CURRENTS.*

BY HERBERT F. PITCHER, M.D., HAVERHILL, MASS.

High frequency is the most popular of any of the electrical currents. The usual high frequency machine is not very expensive, and its technique is easily understood. Any tyro can turn on the juice and rub the brilliantly colored tube over a stiff joint or an inflamed muscle. Many times this procedure is accompanied with great satisfaction to the patient and the attending physician. The doctor soon becomes quite an enthusiast, and thinks if this easily applied remedy will cure a stiff and painful muscle, why not a painful nerve? But when that painful nerve proves to be an acute neuritis he finds he has run up against a serious problem. In this way many honest minded physicians become interested enough in electricity to purchase a high frequency apparatus, and without any definite knowledge of its physiological action apply it promiscuously, with the result that they not only lose their patients, but their faith in electrical treatment. The secret of success in the use of high frequency, as in other forms of electricity, lies in a thorough knowledge of the various currents and their physiological action on the system. That portion of the medical profession who decry the benefits of electricity as a remedy do not take the trouble to investigate its merits, but sneer at the reported results and say: "Suggestion, mere suggestion."

We do not hold it up to the world as a universal panacea, but use it honestly and conscientiously as we would any other remedy, sometimes as an auxiliary to other treatment, but always with the therapeutic indication clear and definite. The time has now come when we can demonstrate to the unbeliever that the beneficial results from the application of these currents is not due to suggestion. For instance, we can actually demonstrate that the d'Arsonval current will lower blood pressure when hypertension exists; that it will increase the total quantity of urine, together with an increase in the amount of urea and chlorides, and will cause a decrease in the

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amount of uric acid and phosphates, owing to increased oxidation. It will also cause peripheral vaso-dilatation aiding evaporation from the skin.

With the vacuum tube applications we can produce a hyperemia with such a dilatation of the cutaneous blood vessels that it will relieve congestion of internal organs, as well as local congestion and stasis. We can demonstrate that bacteria exposed to sparks or the effleuve can be killed; that infected wounds and foul ulcers can be healed. With fulguration we can remove epitheliomata and other superficial growths as well as many pathological conditions. With oscillatory desiccation or diathermy we can destroy larger tumors by heating the tissues to the point of coagulation or desiccation. These are a few of the many results produced with the high frequency currents, but they are cold facts and cannot be denied.

We have found that the high frequency currents dilate the arteries and aid general nutrition; consequently we should use this method of treatment when there is need of increasing vital combustion and general metabolism, when there is need of increasing the elimination of waste products, when hypertension exists and we wish to lower blood pressure, when we wish to increase glandular activity, when we wish to increase the blood supply to a given area, when we wish to produce absorption of plastic exudates, when we want a local germicide or a caustic, when we want to allay pain or sooth the nervous system, and when we want to produce a general vitalizing and invigorating effect without undue stimulation. Recognizing, then, the physiological effects of the high frequency current, we find it a most powerful agent in the correction of pathological conditions. Possibly its most important indication is the use of the d'Arsonval auto-condensation current in arterial hypertension and deficient metabolism.

What is the indication for the use of high frequency in arterio-sclerosis? First, catch your patient—if possible, before organic changes have occurred in the coats of the arteries. There is no known method of *permanently* reducing arterial tension after the arteries have become thickened and brittle; but with a manageable patient we can correct the diet and manner of living generally, and this, together with the d'Arsonval auto-condensation treatment, will do very much to make his life comfortable and prolong his days. Even

when the blood pressure is above 200 m.m., with a throbbing headache, dizziness, and other symptoms of impending apoplexy, the condition can be relieved by the use of the d'Arsonval current and the patient saved from impending danger. This current is indicated in all cases complaining of headache, dizziness, insomnia, impairment of memory with an arterial tension above normal.

Care must be used not to get too enthusiastic with this treatment, for too prolonged a séance is liable to prostrate some patients and the feeling of lassitude alarms them. A ten-minute treatment is long enough to begin with. This can be increased later to twenty minutes if necessary. Some cases show a rise in blood pressure about middle life without discoverable organic disease. If these cases are allowed to go on without interference they will eventually become subject to arterio-sclerosis and renal disease. The early recognition of hypertension and its correction by diet and auto-condensation should be considered the most important prophylactic measure in the prevention of arterio-sclerosis and nephritis.

"The methods of d'Arsonval, either by auto-condensation or auto-conduction, by either of which the patient is placed in a field of high potential stresses, the current of high frequency to a greater or less extent surging through the tissues of the body are remarkably active in lowering arterial tension. The lowering effect is probably induced by a complex action of the current: 1. Upon metabolism promoting tissue combustion and elimination, as demonstrated by the marked increase of solids with the urine; and another effect upon the vaso-motor centres by which means tension is promptly relaxed as determined by the sphygmomanometer." (Snow.)

De Kraft claims that all forms of high frequency currents have some effect in relieving hypertension. He says: "So surely can arterial spasm be relieved by the bipolar and auto-condensation methods that it may be said that wherever sphygmomanometer reading remains persistently unchanged following a proper application of the methods described, we are confronted with a case where serious changes in the cardio-vascular system have already begun."

What are the indications for high frequency treatment in rheumatism? As acute rheumatism is an infectious disease usually accompanied with high temperature confining the pa-

tient to the bed, I will mention only the chronic forms. We think we can safely say that the condition called rheumatism is caused by a faulty metabolism, usually from excess of proteids, malt liquors, want of exercise, etc. Where the etiological features of the disease seem to be associated with the circulation of the toxins in the system, causing painful and swollen joints, painful muscles, or painful nerves accompanied with malaise, the d'Arsonval current should be given daily as a constitutional remedy, followed by the application of the vacuum electrode over the painful surfaces. As this disease is usually accompanied with hypertension and inaction of the liver and bowels, the condenser vacuum tube should be used over the liver and along the course of the colon. The treatment relieves the arterial tension and eliminates the toxins. In chronic rheumatism and rheumatic gout, auto-condensation should be given daily if possible with a dosage of from 300 to 700 m.a. for ten minutes.

In lumbago the condenser vacuum electrode applications are particularly efficacious. The writer makes the applications to the bare skin for the reason that a more powerful and penetrating current can be given for a longer period. The patient should bend forward as far as possible in order to put the muscles on the stretch. The treatment is continued until any posture can be taken without causing pain. In obstinate cases good fat sparks from the tube should be used. I have known one such treatment to cure a severe attack of lumbago which had kept the patient from work and from sleep for several days and nights.

In chronic lumbago or lame back the treatments may be required for several weeks. The local applications should be preceded by the d'Arsonval or wave current for the constitutional effect. Acute torticollis can usually be remedied by a few applications from the vacuum tube along the sterno-cleido-mastoid muscle and also over the back of the neck, through the clothing, in order to get the short, thick sparks.

The use of the high frequency currents in *gonorrheal rheumatism* is the best and in many cases the only treatment which will benefit or cure those infectious cases. A Titus vacuum tube is applied against the prostate gland, giving a moderate current to the prostate and the seminal vesicles, for ten minutes. The d'Arsonval current is given for ten min-

utes and at the same time applications with the vacuum tube are made to the inflamed joints. This treatment is equally efficacious in the sequælae of gonorrhoea in the female. The vacuum vaginal tube is applied to the uterus or fallopian tubes for ten minutes. An insulated tube with a fairly high vacuum is preferable by reason of its penetrating properties.

In so-called sciatic rheumatism, the d'Arsonval current can be used, and at the same time the condenser vacuum tube is applied over the great sciatic notch and held there until the surface is reddened or until the patient complains of the heat and prickling; then the tube can be applied over the whole course of the nerve until a thorough hyperemic effect is produced.

The aches and pains of middle aged and elderly people, the lame backs and stiff shoulders which they describe as rheumatism, the general debility and cold hands and feet which they attribute to poor blood, all of these miseries which accompany declining years, can be relieved and life made more comfortable and of longer duration by the use of the d'Arsonval current and the vacuum tube applications. It is the treatment *par excellence* for this class of *patients*. They frequently remark: "That form of treatment always benefits me." And why should it not benefit them? It softens the hard, wiry pulse of high tension or arterio-sclerosis, it dilates the peripheral circulation and brings color to their pale skins and sends red blood to their cold extremities and limbers up their stiff joints.

In the treatment of diabetes mellitus I have never found a remedy of the slightest benefit outside of the regulation of diet, hygiene, etc., until I used the high frequency currents. I think we now have a method which will cope with that disease if taken in its earlier or middle stages. The d'Arsonval auto-condensation current of from 400 to 600 milliamperes, given from 10 to 20 minutes 3 times a week has been of decided benefit in all the cases coming under treatment. The cases treated have been between 40 and 60 years of age with deficient metabolism. The beneficial influence of the current seems to be upon nutrition through the sympathetic nervous system and by increasing oxidation and elimination.

In subacute and chronic neuritis it is well to begin treatment with the Tesla bi-polar current in order to avoid any contrac-

tion. A tube with a low vacuum should be applied over the painful nerve for 10 or 15 minutes. After a few treatments a more vigorous method can be employed, even mild sparking being beneficial. Although neuralgia is usually better treated with the continuous current, sometimes the high frequency currents act like magic, the revulsive effects giving warmth and stimulation to the terminal nerves, which is very gratifying. In many cases the relief from pain immediately follows the application, yet the result is not generally so permanent as when the continuous current is used.

Bronchial asthma can be very much relieved by the use of the auto-condensation treatment, with applications from the condenser tube over the chest. In conjunction with this current prolonged mechanical vibration can also be used with advantage over the cervical and dorsal regions of the spine.

High frequency currents by the use of proper vacuum tubes are very useful in catarrhal conditions of all mucous membranes.

Acute tonsillitis can be aborted by the use of the bi-polar method. After spraying the tonsils with a 4 per cent. sol. of cocaine, apply an insulated vacuum tube to the surfaces of the tonsils, giving convective sparks to the diseased crypts for about four minutes; then give a good hot treatment externally with a condenser tube for 10 minutes. In chronically diseased tonsils when for any reason the operation for enucleation is inadvisable, the classical treatment of fulguration can be used.

The high frequency bi-polar method is indicated in *laryngitis* and *bronchitis*. Thorough applications with the vacuum tube electrode should be given over the throat and chest. If a more decided hyperemic effect is desired the treatments can be given through the underclothing. It is very beneficial to apply good sharp sparks over the larynx and between the shoulders.

The same method can be used in treating tubercular adenitis, in conjunction with the x-ray. In pulmonary tuberculosis the treatments should be given on the auto-condensation couch, and at the same time apply the condenser vacuum tube over the chest and between the shoulders. The x-ray treatments should be given on alternate days. I have found the effleuve given over the chest until there is a decided hyperemic effect produced, of great benefit in nearly all pulmonary

diseases. The intense hyperemia relieves pulmonary congestion, aids nutrition, and thereby reinforces the tissues to repel bacteria.

Fulguration is a most expeditious method of treatment in epitheliomata, navi, moles, warts, keratosis, etc. In the treatment of epitheliomata in elderly people by the x-ray, the tissues do not react sufficiently.

The growth may be reduced, but an indolent ulcer remains which is made worse by prolonging the x-ray treatment. Fulguration is now indicated with the result that the ulcer is perfectly healed when the crust comes away.

The experiments performed by Dr. Law and reported at the last meeting of the American Electro-Therapeutic Association, should show us that the final word has not been spoken in the consideration of high frequency currents and their possibilities. Dr. Law found that bacteria exposed to sparks of the effleuve were killed, but he found that bacteria exposed to the discharge from the vacuum tube were not affected. Bacteria protected by animal tissue of the thickness usually found in diseased conditions were not affected, consequently we find definite rules to follow. I have verified the experiments many times and have found the effleuve will produce sterilization of the tissues in cases of open abscesses and furuncles in infected wounds and in indolent sores and ulcers.

A large field in dermatology is open to the benefits of the high frequency currents. In the old chronic forms of eczema where the skin needs a decided stimulant, the vacuum tube treatment is very beneficial. Applications should be given for from 3 to 6 minutes. One half inch sparks will relieve the intense itching and stimulate the most indolent patches to heal.

Acne Vulgaris can be most successfully treated with the vacuum tube, and the effleuve from a resonator. The tube should be a low red vacuum and should be kept moving slowly over the pimply surface for 8 or 10 minutes from 3 to 6 times per week. In the pustular form the effleuve can be brought to a concentrated point and applied to each pustule; a few sparks hasten resolution. This same method of treatment is of great benefit in lupus, in lichen planus, in psoriasis, and in obstinate pruritus, especially in the genito anal region.

Incipient furuncles can be aborted with the effleuve, but I have never been able to abort carbuncles, partly because sup-

puration has already occurred before the patients apply for advice. After the carbuncle is freely incised, the high frequency effleuve is allowed to play down into the open wound 15 minutes. This will sterilize the necrotic mass and will promote resolution after a few applications.

I cannot agree with the authors who claim that hemorrhoids can be cured with the vacuum tube, although this treatment for anal fissure is highly successful. Neither can I agree with those who say urethral caruncle can be cured with the high frequency vacuum tube. It is good treatment for an irritable or inflamed urethra, but carunculae will require fulguration, electrolysis or the electro-cautery.

I saw a case which had received thirty applications through the urethral vacuum tube without the slightest benefit. A perfect result was secured with two applications of the electro-cautery.

In this incomplete paper I have merely outlined some of the more common conditions and diseases in which the high frequency currents are indicated.



SOCIETY MEETINGS.**THE TWENTY-FIRST ANNUAL MEETING OF THE
AMERICAN ELECTRO-THERAPEUTIC ASSO-
CIATION.**

Held at the College of Physicians, Philadelphia, Pa., on the 5th, 6th
and 7th of September, 1911.

Morning Executive Session.

The meeting was called to order by the President, Dr. Frederic DeKraft. The reading of the minutes of the previous meeting was dispensed with, and the report of the Board of Trustees was read.

The report called particular attention to the cessation of the publication of the bound volume of the Transactions, which action was taken because such transactions are regularly published and issued to all Fellows in the Official Organ, the Journal of Advanced Therapeutics, and because the subsequent publication of the same material in another form was deemed an expensive superfluity.

The following physicians had been elected to membership: Drs. D. C. Moriarta, J. W. Frank, Edgar A. Pole, R. D. Baker, C. S. Potts, Louis von Cotzhausen, J. L. Myers, R. H. Dinegar, Geo. W. O'Grady, Wm. T. Johnson, G. E. Day, Chas. R. Collins, John Cook, W. J. Carpenter, R. S. Macrum, William Martin, D. H. Yates, F. B. Ennist, and Elizabeth W. Wright.

Honorary Fellowship was bestowed on Dr. Foveau de Courmelles of Paris, and Mr. Charles Lorenzo Clark, of New York.

Proceeding to the election of members, the following were elected: Drs. A. J. Hopkins, L. A. Brustad and S. Leslie West.

Following a brief report by the Committee on Arrangements, adjournment of the business sessions was taken and the scientific session opened by an address of welcome by the Mayor of Philadelphia with response by Dr. Charles R. Dickson of Toronto.

Then followed the President's address, History of the Development of High Potential Currents, by Frederick DeKraft, New York, to whom a unanimous vote of thanks was tendered.

Committee reports were read as follows:

On direct continuous current, including electrolysis, electrochemical surgery, ionization and all apparatus connected therewith. Dr. G. Betton Massey, chairman. Discussion by Drs. Wm. Benham Snow and F. B. Bishop.

On induced current, including alternating and high fre-

quency currents and apparatus. Dr. Frederick M. Law, chairman. A supplementary report was given by Dr. F. Howard Humphris on the Treatment of Obesity. Discussion by Drs. Wiss, Snow, Titus, Massey, Walton, F. B. Bishop.

On static currents and apparatus. Dr. Herbert F. Pitcher, chairman. Supplementary report by Dr. F. Howard Humphris. Discussion by Drs. Humphris, Titus, Snow, Walton.

On phototherapy and apparatus. Dr. Edward C. Titus, chairman.

On radiotherapy, radiography and apparatus. Dr. George E. Pfahler, chairman. Discussion by Drs. Massey, Snow, Hirsh.

On mechanical vibration therapy, exercise therapy and apparatus, Dr. Fred H. Morse, chairman. Discussed by Dr. Hirsh.

On Dietetics. Dr. Byron S. Price, chairman.

On Standard therapeutic measures. Dr. William Benham Snow, chairman. Discussion and remarks by Drs. Massey, Titus, Dickson, F. B. Bishop, Humphris and Pitcher. A motion was made, seconded and carried, authorizing the printing of 1,000 copies of this report on Standard Therapeutic Measures for distribution to Fellows of the Association as a complete and up-to-date classification of therapeutic measures receiving the approval of the American Electro-Therapeutic Association.

A paper on X-ray in the treatment of Cancer of the Breast, by Dr. J. N. Scott of Kansas City, Mo., was read by title. Dr. Pitcher read a paper on "Some Therapeutical Indications of the High Frequency Current."

Static Electricity in Nervous and Mental Diseases by J. J. Kindred, Astoria, L. I., was discussed by Dr. Snow.

The Modern Treatment of Cardio-Vascular Diseases by Dr. William Benham Snow of New York, was discussed by Drs. Bassler, Slaughter, Massey, Price, Werber, Baker, and Humphris.

Experiences of a Pioneer Electro-therapeutist in Mississippi by Dr. Rosa D. Wiss of Meridian, Miss., was discussed by Dr. Massey.

The Rational Treatment of Tuberculosis, by Dr. Arthur W. Yale, of Philadelphia, was discussed by Drs. Tice, Pfahler, W. T. Bishop, Newcomet, Titus, Snow, Kindred, Heuel, Pitcher, Bassler, Humphris.

Clinical Benefits from the Employment of Electricity in Gastro-Therapeutics; Confirmed Results and Deductions from over One Thousand Cases so Treated. Dr. Anthony Bassler, New York. Discussion by Drs. Massey, Snow, Hirsh.

A Rational Muffler for the Static or High Frequency Spark. Dr. George E. Pfahler, Philadelphia. Discussed by Drs. Snow, Massey, Titus, Waite, Pitcher, Hirsh.

Consultations Regarding X-ray Dosage: The Physician's Duty to Prescribe X-ray Earlier in Cancer. Dr. Sinclair Tousey, New York. Read by Title.

Radium. Dr. W. S. Newcomet, Philadelphia. Discussed by Dr. Snow.

End of Tuesday's Session.

REPORT OF COMMITTEE ON DIRECT CONTINUOUS CURRENT, INCLUDING ELECTROLYSIS, ELECTRO-CHEMICAL SURGERY, IONIZATION, AND ALL APPARATUS CONNECTED THEREWITH.*

On the subject of ionization the Committee feels that too little attention is still bestowed on medicamental ionization with low volt currents in this country. The work of Leduc, in France, as presented in the translation by R. W. Mackenna of his small brochure "Electric Ions and their Use in Medicine" is most attractive and should be largely read. This subject was extensively treated in this Association in the late 90's, and it is possible that we failed to obtain the full results attainable through a defective technic. Too small a skin surface was doubtless used for the medical diffusion of the ions through the skin, resulting in skin irritation that limited the work. With the parts immersed in local baths, contained in some non-conducting receptacle, neither the active nor inactive electrodes will irritate the skin unduly, and comparatively large currents may be used for adequate durations. Instead of the baths we may employ very large electrodes of several layers of absorbent cotton wet with the solution, over which a bandage-like strip of tin foil may be wound, to which a fine wire conductor is attached at some point by the simple process of threading it to a corner and bending the corner on itself.

The solution from which we wish kations or anions driven into the local part should be placed under the pole appropriate for the ionization of course, those that are driven in as kations under the positive and those as anions under the negative; but little attention need be bestowed on the strength of these solutions except to have them quite dilute, for the same number of ions will be dispersed from any solutions by currents of the same strength and duration. A reasonable dilution assists the action, in fact.

*Read before the Twenty-first Annual Meeting of the American Electro-Therapeutic Association, September 5, 1911, at the College of Physicians, Philadelphia, Pa.

With a large bath or thick pads we may also employ erodible tin foil as the positive plate outside the pad for currents of moderate duration without driving the ions of these metals in, provided we use new pads at each treatment, for these ions will be arrested for a time by the pad while the medicamental ions are driven before them into the part.

Of surgical ionization, the only new feature is the experimental employment of arsenic ions in the treatment of inoperable cancer, a preliminary note on which will be presented during the meeting by the chairman of the committee.

Any constant current apparatus may be employed for ionization, but we must repeat the injunction contained in former reports that greater care should be exercised by manufacturers in the construction of adequate controllers and the supplying of their apparatus with approved meters, rather than the incorrect ones too often supplied.

Discussion.

Dr. William B. Snow of New York. Dr. Massey's papers are always a lesson. They hardly call for discussion; we take them as a schoolboy would.

Dr. Francis B. Bishop, Washington. It is hardly fair to let a report like that go by without some attention from the Society. We, of course, know the elaborate work of Dr. Massey along those lines, and we take for granted all that he says in regard to this special work. He voices the opinion, I am sure, of many of the older men in this Society and in this work when he says that the continuous current is entirely too much neglected. It is one requiring a great deal of study for its scientific application, and one requiring a great deal of trouble, but the results obtained are so far superior to those obtained by other methods—and often not obtainable by any other method—that I think our Society as a whole is paying entirely too little attention to it.

REPORT OF THE COMMITTEE ON HIGH FREQUENCY CURRENTS.*

An important point to be considered in the application of the d'Arsonval current is the influence the amount of dielectric has on the therapeutic effect. The greater the amount of dielectric used, the more superficial is the effect of the current and the more the influence is felt on the sensory nerve endings.

*Read before the Twenty-first Annual Meeting of the American Electro-Therapeutic Association, September 5, 1911, at the College of Physicians, Philadelphia, Pa.

This superficial flow of the current generates eddy currents within the body which act as a gentle massage and thus produce a sedative effect—the patient experiencing a tendency towards drowsiness, sometimes even falling into a gentle sleep.

This internal massage acting on the nerves in the vessel walls produces a dilatation of the vessels in the entire body, causing a general hyperemia, thus nourishing and flushing out the various structures. Now, if we use a small amount of dialectric and substitute for the hand electrode, a metal plate placed directly over the part to be treated, we have a deeper, more concentrated effect, more direct heating of the parts immediately beneath the electrode, as there is more tendency for the current to flow directly through the body.

Larger amperage, lower voltage and higher frequency may be used in this application with the production of intense heating of the parts and intensification of the circulation, bringing larger quantities of blood to the part.

This plate may be placed over any part of the body and a local effect produced. This method has been used in conjunction with the x-rays in the treatment of epilepsy.

Dr. DeKraft has a case now under treatment on whom he is using this method with most happy results. The plate being placed directly on the head.

One of the most valuable uses of the d'Arsonval current is in intestinal autointoxication, where the principle of hyperemia and massage is utilized to the greatest advantage.

This stimulation of a greater afflux of blood to the abdominal organs and the effect of the gentle, rhythmical massage almost invariably produces an evacuation of the bowels. When the current is properly applied with a metal plate over the abdomen, employing large amperage and low voltage, many cases of chronic constipation can be effectually cured.

Clearing out the bowels in the way nature intended and washing out the toxins by the increased quantity of blood and the stimulation of normal activity in the excretory organs is certainly an ideal method of dealing with the many cases of intestinal auto-intoxication which come to us for relief. Clearing up the toxemia and stimulating activity naturally causes Nature to cry for nourishment and we have an increase of appetite. The improvement of the intestinal condition causes a better assimilation of the food and then follows an increase of the body weight.

The use of the bipolar d'Arsonval current or thermo-penetration is one which may be fraught with danger unless very carefully performed. Until we have a definite measure of quantity and know to a certainty the depth of the effect of a given amount of current we will have to proceed with great care in its application. In superficial conditions, the effect can be watched by coagulating a portion of the growth and then

cureting away the slough, thus destroying the growth piece-meal, but in tumors and infections in the interior of the body, great caution must be used and then we are not sure of just what we have done.

This brings us to the question of dosage, a very important point.

It seems to the committee that the dosage should be governed by the effect on the patient and not by the time as measured by a clock.

A great many men give a certain milliamperage, generally the same amount for each patient, for a given length of time. This is radically wrong. The milliamperage should be governed by the condition of the patient, the part to be treated and the effect desired. The length of the seance by the effect on the patient, the treatment stopped whenever there is a flushing of the capillaries of the face. This may take 10 minutes and may take longer. Too many men use electricity according to rule and not according to judgment.

Regarding the resonator discharge, the construction of the resonator has a great bearing on the effect of the discharge. Very little can be done with a small resonator. It is necessary that we have a discharge of sufficient power to penetrate deeply into the tissue before being diffused. This can only be done by a resonator of large size, properly insulated and in perfect resonance.

The property of resonance plays a most important part in all high frequency work and as we delve deeper into the subject and learn more of the effect of different applications we will find the property of resonance bobbing up more and more. Each muscle, nerve, vessel, etc. of the body has a definite wave length and to properly effect this particular part a wave of similar length or octave of that length must be used. This has been proven not only in physiology but in other branches of science. Resonance is one of the secrets of high frequency applications, and it seems to the committee that is the reason we get better results in some cases of similar conditions than in others. The importance of this property of resonance is very clearly brought out in Dr. Clark's technique for oscillatory desiccation.

The condensers play an important part in the construction of a machine and the effect desired. Four small jars in series give more frequency than two small jars in parallel.

The frequency is greater with a static machine than with a coil owing to the lag produced in the coil.

But the most important point of all in the construction, is the insulation of the resonator. This must be as nearly perfect as possible.

In the use of the resonator discharge your committee again calls attention to the use of the grounded metal plate in con-

junction with the effleuve. There is greater contractile response and more concentrated deeper effect than when used in the unipolar manner.

It seems to the committee wise to insert in this report a warning given us by Dr. DeKraft in regard to inhaling large quantities of ozone and nitrous oxide gas. These gases are extremely irritating to the mucous membrane of the respiratory tract and when combined with the ammonium nitrate generated by these gases in the presence of moisture within the case of the static machine are productive of great discomfort and may readily lead to serious consequences. There should be ample ventilation in the operating room and great care used to keep the interior of the machine thoroughly dry and prevent as much as possible the formation of ammonium nitrate.

A word of warning from such an authority as Dr. DeKraft should be heeded as thoroughly as we now heed the warnings given us by the early workers in the field of the x-rays.

576 Fifth Avenue.

SUPPLEMENTARY REPORT BY DR. F. HOWARD HUMPHRIS.

In July, 1909, Professor Bergonie read a paper before the Academy of Sciences upon the employment of electricity, in order to provoke a general exercise—or stimulation—of the muscles of the body, towards a general therapeutic end. In it he embodied the work of some nine or ten years. Since then, I have had the opportunity of seeing M. Bergonie at work and receiving many courtesies at his hands, and studying and practising his methods, and it is his apparatus, and his method, that I am about to describe.

The axiom upon which the treatment is based, may be thus stated:—

The proper use of any organ increases the vitality peculiar to such organ, and also influences the vitality of the entire organization.

This general law is demonstrated particularly in the case of the muscular system—on the one hand, active exercise strengthens the muscles concerned; and, on the other hand, combats the conditions in which combustion is insufficient, such as in obesity, diabetes; or incomplete, as in the uric acid diathesis.

This electrically provoked exercise consists of the muscles being contracted by electric stimulation some 100 times a minute, the aim being exercise without fatigue—a desideratum which has been long sought, and will be admitted to be of the greatest therapeutic value.

Of the various currents which have been tried and found wanting for this purpose, such as the direct, the high frequency, the vertical and Lefebvre's current, it is not probable to enter into now.

The current finally selected, and which is now giving the most satisfactory results, is derived from what may be termed an induction coil, or a coarse wire Faradic, whose co-efficient of transformation is two or three (i.e., four volts in the primary, and eight or twelve in the secondary). Fig. 1. Before the coil are the condensers. The current is rhythmically interrupted and reversed by means of a metronome about 100 times a minute, the aim being to obtain muscular con-

FIG. 1.

tractions, of maximum strength, with a minimum of—one can not say pain, for there is no pain with this treatment—sensation. To accomplish this aim, we must have a perfect regularity of the waves, induced by the make and break of this current. They must be regular, equal, and synchronous. For as much as a muscle contraction is agreeable and painless if produced by such waves, it is equally disagreeable, and even unsupportable, if these waves are unequal in form or frequency. One of the most necessary conditions requisite to insure this regularity, is that the interrupter must act in a perfectly even manner, and the old fashioned simple ribbon interrupter, weighted at its extremity with a piece of iron,

seems to give the greatest satisfaction. The length of this can be varied so as to produce a musical sound of as pure a tone as possible. A little experience soon teaches this. The tone is also modified by the amount of current allowed to flow through the coil. The binding posts should be solidly fixed with screw nuts into the board; also the screw bearing the platinum point should not work too easily. When in working, there should be no spark visible, even if the room be darkened, and this is a condition most difficult to obtain, but indispensable in order to have painless energetic muscular con-

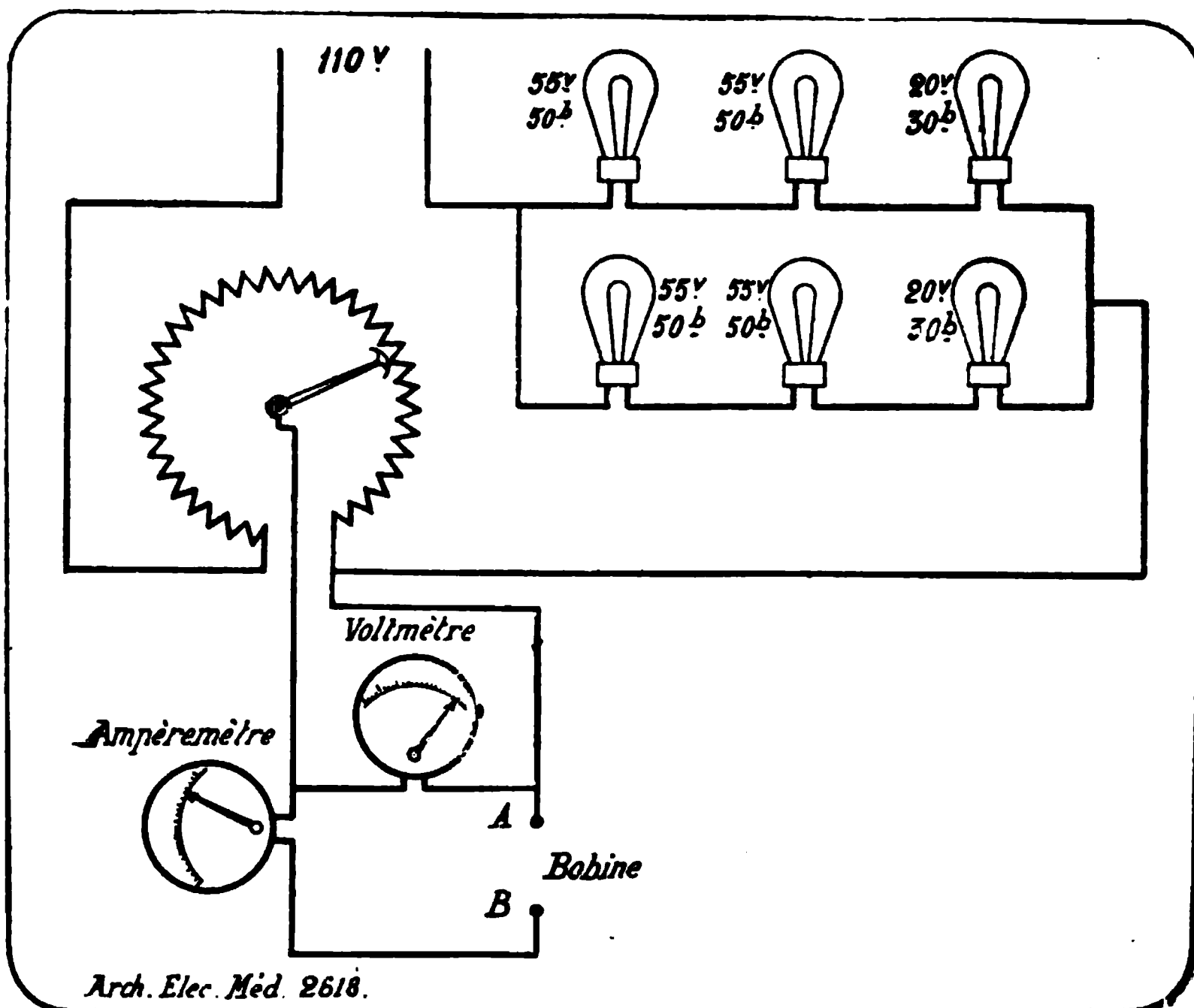


FIG. 2.

tractions. A condenser of suitable capacity and its proper adjustment is one of primary importance. A condenser which one could vary would be an ideal adjunct to this apparatus. In practice, the main commercial direct current is led through a resistance bank of lamps, and through a circular wire rheostat—a volt meter and an amperemeter are put in circuit, and the current led to the coil. Fig. 2. It is varied by means of the wire rheostat, until there is no sparking at the interrupter, and the requisite musical note is heard.

The quantity of current is quite considerable, an average reading being C.=2 A. 55, and E.=24 V., the expenditure of

energy in the primary being over 61 watts, which makes this apparatus—apart from its other modifications—something quite different from the faradic coil of former times. So much for the primary current.

As this is intended to be a practical paper, I do not propose to deal at any length with the study of the secondary current, but I wish to reproduce two oscillographic tracings—one showing the difference between the current and interrupter working harmoniously, and the other when the interrupter was not working regularly—and the patient is as aware of the difference as you are when you see these oscillograms. The points to be noted are (*inter alia*) the purity and clearness of the curve, when there is no sparking at the contact point; but where the interruptions are irregular, the curve is

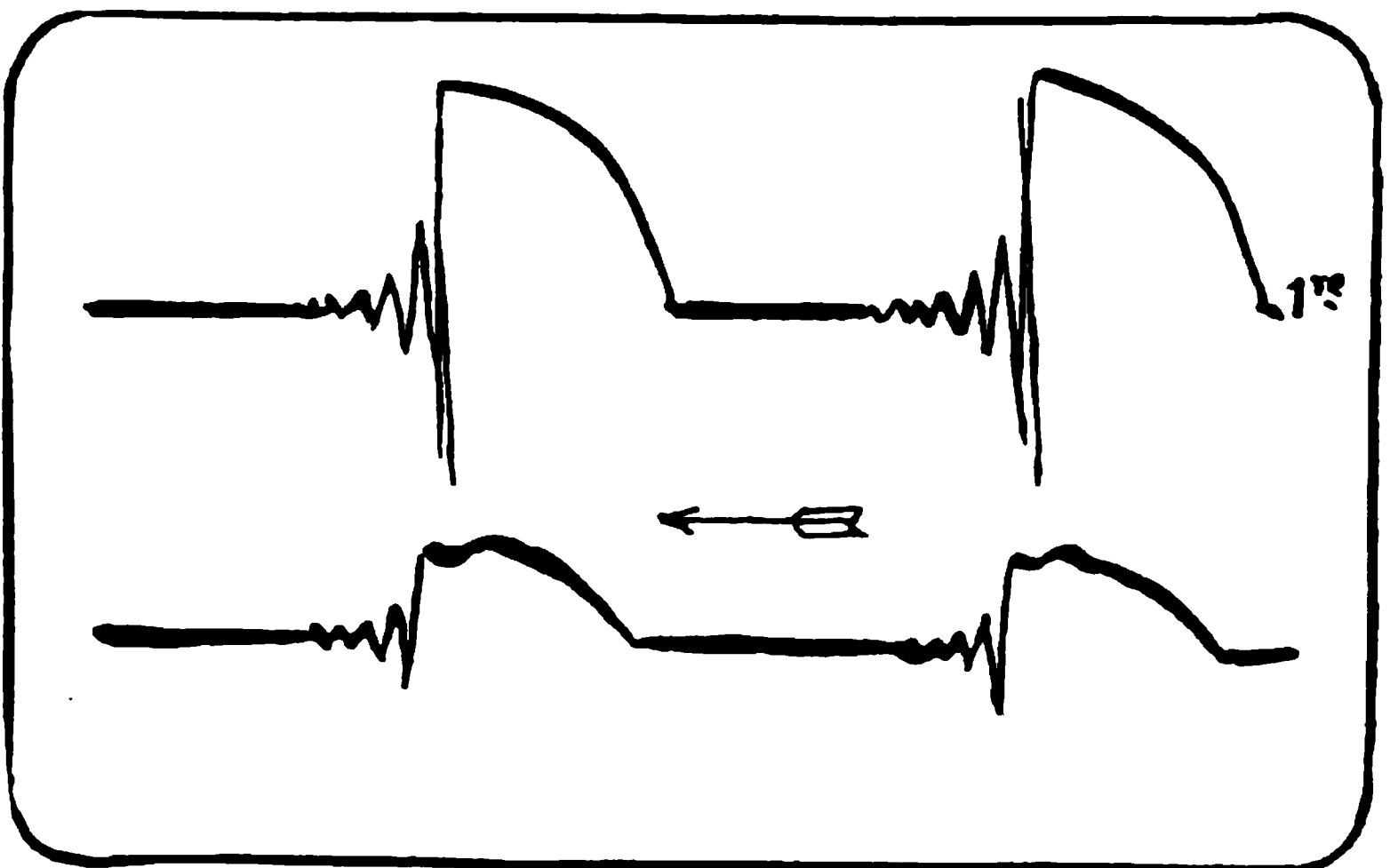


FIG. 3.

irregular. Note also the size of curve; it is much smaller in the latter case, for the irregularity being clearly felt by the patient, it is necessary to sensibly diminish the amount of current employed, and, secondly, the energy of the contractions produced. The oscillations seen after the "break" in the primary, depend upon the composition of the circuit, such factors being resistance, capacity, etc.

These oscillogrammes I publish, Fig. 3, thanks to the courtesy of M. Bergonié, who made them with the oscillographic apparatus of M. Blondel and were published in the Archives d'Electricité Médicale.

As to the rate at which the interrupter should work, the frequency which appears to be the most favorable, is that of 30 times per second.

We have finished with the primary and secondary currents and come now to the metronome, Fig. 4, with which I have already said the current is interrupted on its way to the patient. It is not possible to tetanize a muscle by the faradic current, without giving rise to pain, fatigue, and even the exhaustion of the muscle. It is necessary, however, to follow each electrically executed contraction of the muscle with a period of rest equal in length: in a word, rhythmic currents

FIG. 4.

must be applied. As a matter of fact (as an examination of the oscillogramme shows, or watching the muscular contraction proves) we do not get a symmetrical current—i. e. the efficacy of the stimulation varies with the personal factor, viz., the patient. But by reversing the current at each interruption, we more nearly approximate regularity. The metronome is the most simple and practical apparatus for obtaining this rhythmic inversion. The wave rheostats which allow of the progressive increase and the slow decrease of the current,

are not suitable for this apparatus, however useful they are for other classes of disease, notably wasted muscles. But here we are dealing with healthy muscles, which need the most energetic work possible, and it is obvious that the muscle which is made to contract twice a second, does more work, and

produces a more intense combustion, than the muscle which is only contracting once per second. But in practice, the rate which produces the best results and which is the most comfortable to the patient, is when the metronome is regulated to 100 to 120 interruptions per minute.

Having passed through the metronome, the current reaches a wall plate which at first sight looks rather complicated. Fig. 5. From this, it is distributed to the various electrodes. In addition to the two points of entry for the current, it contains a hot wire meter graduated from Zero to 100 Ma., and an automatic clock by which the length of the treatment can be automatically ended at the expiration of five, ten, fifteen, or any multiple of five minutes up to one hour. It also carries a rheostat with three rows of resistance—one row of 10,000 ohms, one of 1,000 ohms, and one of 100 ohms—each row being divided into tenths. Below these are 12 knife switches, controlling the polarity of the 12 electrodes—being positive if the switch be up, negative if turned down: thus many varied combinations may be made. Below these again there are 12 rheostats, each corresponding to the part where the electrode is applied—back, leg, arm, abdomen and so forth. These are simple sliding resistance, with 20 stops in each, each stop being equal to 100 ohms, so that each part of the body receives that amount of electricity which it can comfortably bear.

Lastly, on the lower edge of the wall plate, or distributing board, are the points of exit for each electrode.

Electrodes. As the object aimed at is the simultaneous stimulation of the greatest number of muscles of the body possible, the electrodes should be of as large surface as possible. They are of two kinds—stationary and movable. The stationary electrodes are always the same, irrespective of the size and weight of the patient, and take the form of a semi-reclining chair, of which they constitute the seat and back, two forming the seat, and two the back, being separated each from the other by a small space. (Fig. 6.) They are made of metal, and connected to the points of exit on the wall-plate. Each electrode is covered with a towel wrung out of warm water, and the patient, clothed only in a light dressing-gown, seats himself on the chair. The movable electrodes are semi-cylindrical pieces of metal varying in surface, form, curve, etc., and are placed with the intervening warm, wet towel on the part of the thigh, under the calf (resting on a special support), on the abdomen and on the arms—12 electrodes in all. The total surface covered by these electrodes is very large, and may, in some very fat people, be even 10,000 square centimetres, which would work out, with a 50-Ma. current, at 0 Ma. .01 per square centimetre. This one can easily see would only produce a comfortable feeling at the point of contact and that pain is impossible. The resist-

ance which the body offers naturally varies considerably, but Professor Bergonie has measured it with all the electrodes well applied and well dampened, at less than 200 ohms.

The movable electrodes may be held in position in two ways — either by means of rubber bracelets, or by sacks of

FIG. 6.

sand placed on the lower limbs and abdomen of the patient, exercising a considerable pressure. This pressure is of considerable advantage. Firstly, it keeps the electrodes in good contact, in spite of muscular contraction; and secondly, it gives more work to the muscles when they contract. Some fat people can be thus laden with the sacks up to 200 pounds, without an appreciable diminution in the electrically stimulated movements. This great weight is easily moved by the con-

tracting muscles without fatigue, and without the least painful sensation. Were it not for the passage of the electric current, the weight would be difficult to support.

The average current, with the electrodes arranged one pole to the back, and the other pole to all the other electrodes, the metronome working, the interrupter well regulated, I find to produce good contractions with a man of ordinary muscles, 25 to 30 Ma. sufficient, but I have seen in very fat women with muscles poorly developed, 70 to 80 Ma. registered on the meter, without the sensation being in any way painful.

The treatment should never be tiring, but if at first it be too violent or of too long duration, there will be some muscular stiffness. As a rule, it is best to begin with a treatment of 20 minutes, increasing by 5 minutes daily, until 40 or 45 minutes daily is reached. Professor Bergonie in some cases advocates increasing this to 60 minutes and giving the treatment twice daily, and says that even this is not a maximum, but naively adds: "It is about enough for most patients."

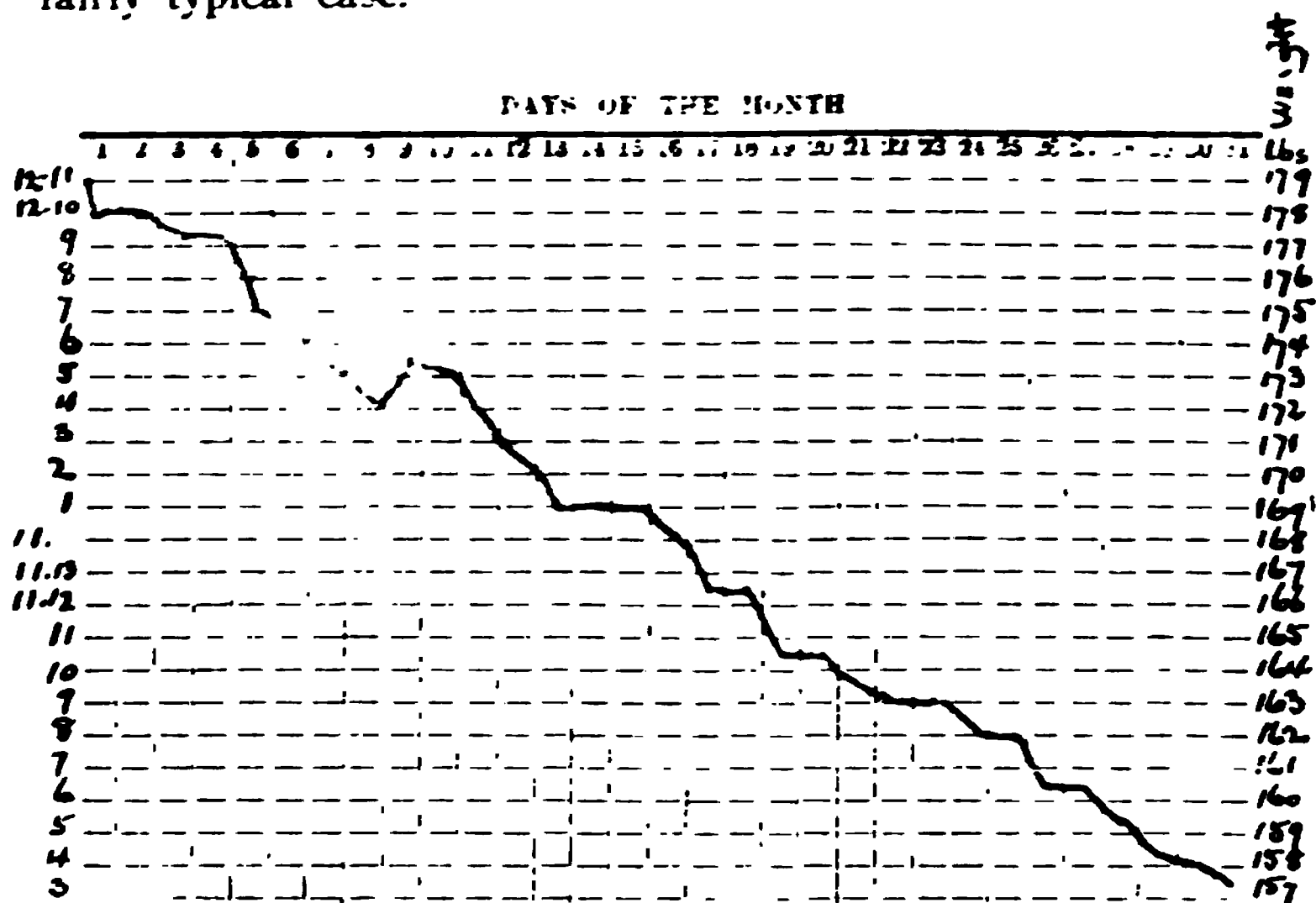
This is not the time or place to discuss the results of the treatment, but may I be permitted to say a few words in order to complete a description of my subject.

It is, I hope, superfluous to point out that patients undergoing this treatment should be under continual medical supervision. In a patient in whom great metabolic changes are daily taking place, it is obvious that the medical adviser should keep a daily watch upon the patient—listening to the heart—examining the urine—especially for albumen and acetone—watching for and guarding against constipation and in the many other ways which will suggest themselves during the course of the treatment—and with this careful supervision, no harm can possibly come, but only benefit certainly ensue from even a prolonged course of this electrically excited exercise.

The patient begins to lose weight from the first and a feeling of alertness, of lightness and general well being, replaces the lethargy from which these patients so often suffer. The effects also have a permanent character. The effect on the general health is marked from the first, and seems to be almost out of proportion to the number of pounds lost. In very stout people, the treatment should last a month or six weeks, during which time I have seen 20 to 30 pounds, and in one case 40 pounds lost, the patients feeling in capital health and

spirits all the time, and were all able to work, or pursue their usual vocations, with added zest.

The effects of this current in the treatment of obesity are immediate. I append a chart of a month's treatment in a fairly typical case.



The diet during the treatment should be purely vegetable, as there is so much animal combustion going on, in fact, it may be said that by the aid of this electrical current, one eats oneself and takes a little salad with his food.

8 West Chapel Street, Mayfair.



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THE PRESENT STATUS OF X-RAY TREAT- MENT OF CANCER OF THE FEMALE BREAST.

Current medical literature presents two opposite phases as to the indications for the employment of the x-ray in cancer of the breast—the one which gives a precedence to surgery and makes the x-ray an accessory, and the other which assumes that the x-ray gives a longer lease of life than surgery. Another question in which difference of opinion is found, is the consideration of the technique relative to the employment of the x-ray in connection with surgery — whether to employ pre-operative or post-operative raying, or both.

In the October number of the Archives of the Roentgen Ray, Professor Stéphane Leduc of Nantes, says: "The surgical ablation of malignant tumors, cancer, epithelioma, sarcoma, and the like, results in permanent cure only in exceptional cases. As a general rule, surgical interference is followed sooner or later by local recurrence and generalization of the disease.

"The received opinion is that all malignant tumors are in their early stages merely local, so that a complete cure may be obtained by early and complete surgical ablation. Unfortunately, this is not the case; the facts are quite otherwise. Generalization and recurrence in the cicatrix and glands frequently follows even when the tumor has been completely excised in its earliest stage. So frequently is this the case that we are bound to conclude that the disease is regional, and not entirely local, from the very beginning, even before the neoplasm is recognizable by the naked eye—the whole of the lymphatic circulation

in the region being invaded, and the neighboring glands being infected. This is proved by the fact that recurrence is frequently observed in the cicatrix of an incision at a considerable distance from the neoplastic focus.

"For some considerable time after this regional infection by malignant disease, the lymphatic glands are able to defend the organism against the general invasion of the disease. The glands here play a double role; they are both fortress and garrison, arresting the invasion and defending the organism against the entrance of the pathologic germs.

"If this idea is correct, the surgical ablation of the lymphatic glands in an early operation for cancer is much to be deprecated, since their destruction removes the only barrier to invasion and the only defence of the organism. After the operation, the lymphatic circulation is re-established, but without its natural protection. Hence the dispersion of the disease germs will be much more rapid and the generalization much more extended. One cannot help suspecting that we should have heard less of the surgical removal of cancerous glands if the visceral generalization had been as easily recognizable as is the local recurrence in the glands or scar."

It will be seen, therefore, that Leduc's premises radically oppose the Halstead operation. This has been the opinion and teaching of the editor for the past ten years.

In a large number of cases in which recurrence takes place, there had been but a small nodule at the foci indicating operation. This then seems to give little or no justification for the radical operation by the Halstead method; and furthermore it gives good grounds for the opinion specified by Leduc that even when there is a small local involvement, there is as a rule a diffused infection, when the presence of the lymphatic glands is essential to resist an extension of the invasion. That this is so in all cases which do recur, is self evident. Who can say in what cases it will not be so? Certainly not the surgeon, or he would not, if wise, remove the axillary and other lymphatic glands in such cases.

Professor Leduc states furthermore as follows: "The method which has been so much recommended of late—viz., that of 'post-operative radiotherapy'—I consider to be most injurious. The surgical operation opens the lymph and blood channels, and gives rise to a generalization of the disease; the germs are widely sown throughout the organism, and the subsequent irradiation is wholly inefficacious. If surgical ablation is thought necessary, the radio-therapeutic treatment should be given before and not after the surgical interference."

At the recent meeting of the American Roentgen Ray Society some of those who took part in discussion radically opposed pre-operative raying, but asserted that post-operative raying should be observed in all cases. The reason given for this stand was the possibility that metastasis might be occasioned by such raying, which is directly opposed to the views of Leduc and other authorities. There could be but little if any danger of metastasis from pre-operative raying. If, however, the ray was used over a malignant growth of considerable size until the tissues broke down, there might be auto-intoxication from absorption, but not metastasis. This notion has undoubtedly been created by the surgeon's opposition to the use of the Roentgen ray and cannot be definitely established as a principle in radiotherapy.

There has been for a long time an attitude assumed by the surgeons and those radiographers who constantly come in contact with them tending to create a prejudice in favor of the surgical treatment of malignant disease which when compared with other means does not seem to be entirely warranted, judging from the results obtained.

Why a surgeon should operate upon an advanced case of malignant disease which offers no possibility of being cured by such operation can only be explained from one point of view. The surgeon well knows that the sufferer must go through the same final ordeal of suffering and death as though the operation had not been performed, and there is absolutely no denying the fact that cases under treatment with the Roentgen ray would live much longer and suffer less when treated by the Roentgen ray and radium than if subjected to the surgeon's knife.

One other view expressed by Leduc though revolutionary—radically placing the x-ray before the knife in all cases—is deserving of great consideration when coming from one noted for long experience and conservatism; particularly so from the observations presented. He says: "I believe that results may be obtained in the treatment of malignant disease which greatly surpass those obtainable by surgical interference. I have convinced myself of this by the following evidence: On more than one occasion I have been able to follow the treatment of a series of cases of cancer under the care of most able surgeons. From a number of consecutive cases the surgeon has chosen those he considered most suitable for operation, while the less

favorable cases have been submitted to radio-therapeutic treatment. I have observed that the result in the cases treated by radiotherapy has been much more favorable, and the time of the patient's survival has been much longer, in several cases as much as six years, as compared with six months after operation."

He states further that at the present time he has under observation a number of patients who had tumors of the breast which entirely disappeared under radio-therapeutic treatment and whose cure still remains perfect after five or six years.

The views expressed in the paper published in the preceding issue of *THE JOURNAL*, by Dr. J. N. Scott of Kansas City, Mo., from the large number of cases reported, seems further to confirm the views of Leduc; and from this time the subject of investigation and discussion will not be limited to the discussion of the merits and demerits of post-operative or pre-operative raying, but as to whether the surgeon's method should have the important place previously accorded in the treatment of cancer of the breast.

SURGERY OR THE X-RAY IN THE TREATMENT OF EXOPHTHALMIC GOITRE.

At recent meetings of State and National Societies, the subject of the treatment of Graves' disease was discussed by two eminent surgeons. Dr. Mayo* said: "In the case of patients in too poor physical condition for operation, I advocate the tying of one or more of the thyroid arteries. This is not a harmless operation, for I have lost three patients out of thirty-seven following this operation."

He says: "After tying the vessels, there is a discharge of thyroid secretion (internal) which almost overwhelms the patient. As soon as the diarrhoea and other severe symptoms are over—about a week—the gland should be removed, for then the patient is in the best condition."

He states further that "Practically all the thyroid cases, outside of those between the ages of fifteen and twenty-three, or during pregnancy, are surgical. During these two periods of a woman's life it is natural for the thyroid to enlarge somewhat.

* Page 1307, *Journal of the American Medical Association*, October 14, 1911.

"In all other cases the surgeon should be consulted early. Graveyards are filled with people who have been treated medically and then rushed off to the surgeon as a last resort. In such cases, if blood has been drawn, the patient 'died of an operation,' not of the disease, or of the medical treatment." Previously in a discussion this author has taken the position that the inoperable cases might be treated with the x-ray, often with surprising results.

The relation of the pelvic organs to the condition of Graves' disease has been frequently referred to by gynecologists and surgeons.

In the other communication* attention is called to the fact that "women are much more prone to thyroid diseases than men, and that goitre has its influence on certain diseases of the pelvis including amenorrhea, dysmenorrhea, menorrhagia, sterility, and premature separation of the placenta."

In the discussion of this paper the general consensus of opinion as expressed agreed with the statements of the author of the paper. One speaker stated that "In one case you will find with the x-ray alone you can overcome almost all the symptoms of hypo- or of hyper-thyroidism; in another case, with the thyroid extract you are using, while in another case you have to use both together, and in still another case you produce disastrous results with either one of the two."

These observations do not indicate a stable state of the surgical mind upon the subject of Graves' disease; and in both cases the surgeons have shown some knowledge of the use of the x-ray in this condition. While their attitude gives preference to surgery, the medical treatment referred to by the first speaker was undoubtedly as "medical treatment" generally implies referred to the employment of drugs, not the Roentgen ray, or otherwise an unscientific use of the latter.

With those who are familiar with the employment of the Roentgen ray in this condition, there can be no question as to its indication. The action of the ray upon the glandular tissue and secretions is inhibitory—lessening the products of the internal secretion; and in that obviating the symptoms of hyperthyroidism. Why surgery should be employed in the treatment of Graves' disease is unaccountable to those who are familiar with the employment of the Roentgen ray in these cases. The only objection that could exist to its employment,

* Page 1311, *Journal of the American Medical Association*, October 14, 1911.

naturally comes either from unfamiliarity with the method, or a prejudice in favor of surgery.

If the surgical operation as at present seeks to remove just sufficient of the gland to limit the internal secretion to the systemic demands, the result cannot be uniformly successful, but an attempt. Whereas in the use of the Roentgen ray the employment of one to three series, as required, effects to a definite degree a lessening of the secretion—just sufficient to relieve the symptoms of hyperthyroidism, thereby correcting the affection. Furthermore, there is a tendency after a period following a series of x-ray exposures for the gland to resume its greater activity to a less degree, but enough to cause some tachycardia. This, however, if it does occur, is promptly overcome by another series of radiations.

The x-ray method is without danger and a much more scientific routine for the management of these cases than surgery, which at best is a guess, and in the best hands associated with danger to life.

The association also of hyperthyroidism with pelvic disturbances, under the present routine treatment of these conditions with the high potential currents and the x-ray, particularly the static current in the treatment of sub-involution, dysmenorrhea, amenorrhea and misplacements, makes possible the removal of a cause as well as otherwise correcting the local condition of hyperthyroidism.

This method will only seem unreasonable to those who are not familiar with the technique and results obtained. It is possible that in conditions involving so much of danger that a greater degree of conservatism will be exercised than at present manifested, and that the better method will be the dominant method.

RATIONAL TREATMENT OF CARDIO-VASCULAR DISEASE.*

BY WILLIAM BENHAM SNOW, M.D., NEW YORK.

The scope covered by my subject can be but briefly covered in one paper. I shall therefore consider only the more pertinent aspects.

The progressive members of our profession now acknowledge that abnormal conditions present in the alimentary canal are the sources of most diseases of toxic origin. Endocarditis, some cases of arthritis, and some affections of the throat have long been considered to be of, so-called, "rheumatic origin," and were supposed to be associated with what was termed the "uric acid diathesis." Nephritis and arterio-sclerosis were likewise attributed to the same or similar causes. All this has changed, and now these conditions are conceded to be due to toxæmia, generally of intestinal origin.

The indications for relief of toxæmia arising from alimentary derangements are (1) evacuation by cathartics and high colonic flushings, (2) administration of intestinal antiseptics, and (3) the limitation and selection of proper foods.

Evacuation.—Calomel and castor oil are the best cathartics in this class of cases; the former, administered in small doses, frequently repeated, until a thorough evacuation is effected. The calomel is properly followed by castor oil and high colonic flushings. In this manner the alimentary canal will be thoroughly evacuated within twenty-four hours and largely freed from the intestinal flora present.

Intestinal Antiseptics.—As the use of calomel and the insoluble salicylates have done service in the alimentary canal, in so-called rheumatism, so the employment of moderate doses of an insoluble salicylate, as asperin, and the daily use of very small doses of calomel, will in a few days assist in cleansing the alimentary canal of the intestinal germs, if, during these days, food has been largely or entirely withheld.

As gonorrheal arthritis promptly disappears when the germs are destroyed in the vesicles or urethra—wherever the process is active—so when the germs are removed in all lesions due to

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intestinal toxaemia do the symptoms abate and the patients recover.

Diet.—The notion that a patient must be constantly fed to live can only be true when he is extremely emaciated, having no deposit of fat upon which life's combustion can be sustained. The avoidance of anything but water, flavored if necessary with beef juice or something that will not be a nutritious bouillon, to cause the friends of the patient to feel that they are not being starved, is most, if not all, that should be allowed in an acute endo- or peri-carditis, or other toxic process of intestinal origin until the fever subsides, and the evidences of an acute toxaemia disappear.

Radiant light and heat systematically applied over the alimentary canal for half an hour three times daily in severe cases and once daily in all cases, employing a high candle power incandescent lamp, or in the absence of a large lamp, by the employment of a lamp of lower candle power for a longer time, are very effective in depressing the intestinal bacteria, and in increasing the intestinal metabolism, thereby favoring the active production of normal secretions and the elimination of poisons.

The general treatment of a patient suffering from localized or general toxaemia with rise of temperature, is the induction of great activity in all the emunctories, particularly of the sweat glands, together with the ingestion of an abundance of water. For this purpose the radiant light and heat bath, which should be a part of the armamentarium of every hospital and sanitarium, affords probably the best means of promoting elimination of toxic materials, and at the same time of restoring tone and activity to the metabolic processes. Dry heat, with the body apparatus, also affords one of the best means of bringing about toxic elimination. The perspiration induced from the body of a patient wrapped in Turkish toweling, when a temperature of 300 to 350° F. is employed for 30 minutes, promotes to a remarkable degree the elimination of toxic materials, and at the same time reflexly increases the vital processes by stimulating the deep cardiac and respiratory centers through the medium of peripheral stimulation. As the toxic symptoms disappear, which will be prompt in cases when the full routine can be carried out, a very moderate diet, principally of milk, may be instituted, and the menu gradually increased by adding well cooked whole wheat, avoiding animal food and vege-

tables too rich in purins, until all evidences of auto-intoxication have disappeared, when a more generous diet may be instituted. Patients, however, who have once shown a tendency to the invasion of the extreme conditions described should be cautioned against ever resuming their old habit of diet, but adhere to a restricted regime, free from an excess of purins, and the *quantity* of food should be limited to that which will just maintain the normal nutrition and energy of the individual. There can be no doubt that an excess of food ingested is the most prolific source of intestinal bacteria and the consequent toxæmia, the unabsorbed excess constituting a proper culture media for the development of the intestinal flora.

This constitutes a rational treatment of acute toxæmias, affecting either the cardio-vascular system or other parts of the organism.

In the forms of chronic toxæmia manifested in hypertension and other chronic processes the foundation is laid for tuberculosis, streptococcic, staphylococcic and the other types of infection. The body's lowered resistance is more likely to be subject to conditions of toxæmia than to inherited predisposition. The prognosis often in cases of severe illness will depend largely upon the toxic processes at work before the onset of the disease.

Cardio-vascular affections of the insidiously progressive type often terminate in the acute conditions previously described, or follow as a result of an acute attack of endocarditis, and must be considered from very much the same point of view as the acute conditions—toxæmia leading up to various derangements of function and condition.

Cardiac lesions may be divided into those arising from (1) excessive exercise, (2) toxæmia, (3) direct infection, and (4) derangements of the neuro-muscular mechanism, often from uncertain causes.

Cardiac hypertrophy with dilatation is certain to develop as a result of energetic athletic pursuits or excessive exercise. No serious result ensues until at some time in the life of the individual, he lapses into a period of physical inactivity. The ventricle then atrophies and the heart is left in one of the most grave of cardio-vascular conditions—dilatation without hypertrophy.

The youth who on the college rowing team has developed

cardiac hypertrophy with dilatation should be warned against ever lapsing into a quiet life; or if he does he must be instructed to always take exercise sufficient to maintain the ventricular tone. It is in these cases that the hypertension arising from toxæmia may provide a favorable compensatory resistance.

The rule governing the habits of these athletes should be to create a demand upon the heart that will maintain an arterial tension approximating that acquired during the exercise period. This will be necessary to preserve a cardiac balance which will maintain the ventricular development.

Processes affecting the heart may be divided into three classes: those arising from excess of normal secretions as the tachycardia due to hyperthyroidism, (2) toxæmias arising from remote infection, intestinal or otherwise, and (3) direct infection, as syphilis, both of the latter affecting the endocardium or pericardium, with the induction of the characteristic inflammatory processes.

These changes may take place either in the form of an acute endocarditis, or a subacute chronic process which ultimately produces valvular incompetency due to development of vegetations or stenosis or both. Under the resulting condition of valvular incompetency, the ventricles become gradually hypertrophied, to compensate for the leaks thus created.

A grave complication arises when a rise of arterial tension is added to an existing valvular insufficiency. A mitral insufficiency with high arterial tension increases mitral regurgitation in proportion to the tension and in extreme cases results in pulmonary oedema.

In cases of stenosis or incompetency of the aortic valve there may be a regurgitant murmur, when the arterial tension is high, which will disappear when the blood pressure is reduced. In other cases, when the valvular lesions are extensive, there may be both a mitral and aortic insufficiency in the same case. Under these conditions, the compensatory hypertrophy of the left ventricle becomes very great.

Angina pectoris occurring in the progress of arterio-sclerosis, is as a rule associated with sclerotic involvement of the coronary artery, which impairs the circulation and nutrition of the heart. In these cases there is certain to be a complicating arterio-sclerosis with hypertension, which constitutes a very

grave combination, the working member being impaired and the labor great and increasing.

These complicated cardiac affections present a most interesting clinical class in which the modern method of treatment by d'Arsonvalization and diet plays a wonderful rôle.

Cardiac conditions due to impaired innervation arising from deranged functions of the sympathetics or cerebro-spinal nervous system, present another interesting class of cases, which are often difficult to differentiate. Clinical study and treatment of these cases demonstrate their characteristics and the relief afforded confirms the locality of the lesion.

The indications for treatment of cardiac affections are, as in all conditions, (1) the removal of the cause, and (2) the relief and when possible the removal of existing abnormal conditions.

Treatment of the athletes' heart should first of all be one of prophylaxis. No individual whose profession will not, during his life time, call upon him to expend a large amount of physical energy, more or less constantly, should ever through any period of his life enter upon a course of training which will produce a marked degree of cardiac hypertrophy with dilatation.

The rowing teams in college athletics should be permanently abolished, for there is no more harmful work than the exertions of these young men during the months of training for the races, when every man is put to extreme exertion, the effects dooming many of them later in life to invalidism or sudden death. Likewise, the running races are the undoing of the men who train for a marathon and endure the test. Such, except by continued exercise throughout their life, are doomed to short life, or one of invalidism.

The man who intends to lead a sedentary or professional career, should never train above the normal standard of healthy manhood, or otherwise he must exercise to about the same degree for life, or take the consequences.

Cardiac lesions associated with valvular impairment are almost invariably of toxic origin. The treatment of these should be directed, as previously stated, to the cleansing and control of alimentary conditions; a judicious regulation of diet, together with the lowering of the arterial tension when above normal. The latter is only contraindicated in cases complicated with *parenchymatous nephritis*.

In cases of mitral insufficiency, complicated by high arterial tension, the consequent pulmonary oedema is promptly relieved when the blood pressure is sufficiently lowered. The following case well illustrates the effects of auto-condensation in that critical condition.

Mr. A., aged 44, during the winter of 1910-11, had been confined to his bed with pulmonary oedema, having had three hemorrhages during the winter, and a consequent persistent cough. He came under observation on April 11, 1911, when his arterial tension was found to be 212 mm. There was also a pronounced regurgitant murmur and marked dyspnoea on exertion. Radiant light and heat and auto-condensation were administered to him three times weekly. At the first 12-minute auto-condensation treatment, employing 500 ma. of current, his tension fell 20 mm. In ten days, with alternate day treatment, the blood pressure had fallen to 150 mm. His cough had disappeared and his cardiac dyspnoea was greatly relieved, and the mitral murmur was also much less pronounced. The treatment was kept up in this manner until May 15th, since which time he has received auto-condensation but once weekly, his pressure not rising to above 140 mm., and being lowered at each treatment to approximately 128 mm. The patient's general health is excellent. There is no dyspnoea except on great exertion and the intermissions in the heart impulse, which were frequent when he came under observation, do not now exceed one per minute. The usual restrictions in diet have been followed, and the present prognosis of the case is good.

Another case, a boy 12 years of age, came under observation May 20, 1911. There were then three distinct blowing murmurs, aortic, mitral, and tricuspid, with evidences of an active endocarditis. The action of the heart was tumultuous. His arterial tension was 135 mm., 50 mm. in excess of normal. The child had been allowed to eat three hearty meals daily and much between meals. He consumed much meat. His diet was at once restricted to a very moderate milk and vegetable regime. Radiant light and heat have been administered over the abdominal and precordial region, together with systematic autocondensation three times per week until August 18th, when mechanical vibration for five minutes over the seventh cervical spine was administered instead. This patient has been in constant regular attendance since he came under observation. He is

growing rapidly, has gained five pounds, the murmurs have become less pronounced, his arterial tension ranges from 85 to 100 mm., and his general condition is in every way remarkably improved. During the last month the treatment for his arterial tension has been by mechanical vibration under the direction of Dr. Arnold Snow. Prolonged five-minute applications, employing moderate pressure with the small ball vibratode over the spine of the seventh cervical vertebra has reduced his pressure fully 15 mm. in one treatment, and has maintained a lower pressure than had previously been obtained by the auto-condensation method. This method of lowering blood pressure is deserving of thoughtful attention and investigation. It is not until recently that the writer's attention has been called to its possibilities.

In another instance the writer has observed the disappearance of an aortic murmur following when the tension had been lowered 40 mm. These clinical observations indicate the importance of maintaining when possible a normal arterial tension in all cases of valvular insufficiency and whenever the cardia is overworked, especially when for any reason its nutrition is impaired, as in *angina pectoris*, when the presence of hypertension is very detrimental to the heart's action.

The pains of angina pectoris and great dyspnoea are promptly relieved by the lowering of arterial tension. The life of these may be greatly lengthened by administrations to them of auto-condensation and light baths.

In tachycardia, due to hypersecretion of the thyroid, the treatment of the thyroid gland by the x-ray, thereby inhibiting the excess of secretion, promptly relieves the tachycardia and dyspnoea of these cases. The results from the treatment of exophthalmic goitre by applications of the x-ray and the static wave current to the thyroid gland are 100 per cent. of success in the writer's experience.

In conditions due to impaired enervation or functional impairment of the neuro-muscular mechanism, the clinical records are generally indefinite. It is probable, however, that often the origin of these cases is not recognized; because the examination of the heart sounds, the heart's dimensions and the character and quality of the pulse, together with the history of the case, will not definitely discover such conditions. A necessary thorough examination over the posterior roots of the spinal

nerves and the sympathetic ganglia to be effective, employs measures for examination which have not yet been generally recognized. It may be possible in some cases to examine these points with the hands, but not so thoroughly as by the method of mechanical vibration, which discovers the tender areas in the intervertebral spaces and elsewhere when present.

The following case will illustrate one of the class of cases under consideration, with the findings and results of physical treatment.

Dr. B., aged 48, came under observation in December, 1908, stating that he had been examined by two expert internists, one in Boston, and one in New York, and advised to go South for three or four months during the winter. No diagnosis had been made in his case, or at least reported to him, and the advice under the circumstances was ominous. He came to me for examination after having purchased a ticket and made arrangements to go South. I found when vibrating the cervical and upper dorsal region that there were areas of intervertebral tenderness, particularly marked on the left side, extending from the fifth cervical to the second dorsal interspace. I also discovered a region of marked tenderness over the left hypochondriac region. The pulse was intermittent, and the first sound subdued. No murmur, nor sign of organic lesion was present, and the patient's blood pressure was but 135 mm. He complained of great dyspnoea upon exertion, not being able to go up stairs, nor walk one block without resting. We were confident after the examination that the lesion at the posterior roots and over the abdominal sympathetic ganglia had much to do with his condition; and suggested that he remain in New York for a few days, and see if we could give him any relief. Prolonged vibration was administered over the regions of tenderness in the lower cervical and upper dorsal spaces and over the right hypochondrium, followed each time by prolonged applications of radiant light and heat over the abdominal and precordial regions and over the back. This was followed daily by 20-minute administrations of the static wave current over the abdomen, particularly over the tender areas. There was marked improvement in his physical condition from the first and at the end of one week he decided to delay his journey for a time. Treatment was continued for one month, at the end of which time he seemed to be in practically a normal condition.

He then went South for one month, returning to New York, he spent the following month in the city and did post-graduate work, during which time he came to the office not more than three or four times and was treated, for which there seemed to be no special indication.

The results in this case indicate the importance of physical treatment in the cardio-vascular conditions of this type. It is probable that the static wave current and mechanical vibration contributed most to the cure of this case. He has been well and in active practice for the last two years. No medicinal or climatic treatment, nor rest would have cured this condition.

Hypertension, resulting from toxæmia, is in most cases the forerunner, which ultimately leads to arterio-sclerosis and its consequences, degeneration with apoplexy and nephritis.

The indication for the treatment of hypertension at any stage is practically the same, viz.: (1) its reduction by the employment of means which do not depress the heart or otherwise unfavorably affect the organism; (2) regulation of diet cleansing the alimentary canal to prevent the possibility of continued toxæmia; and (3) regulation of exercise to the conditions and habits of the individual.

The treatment of hypertension and arterio-sclerosis by the iodides, nitrites, or nitrates, the recognized drug methods, has not been a success and is fraught with too great risks to other functions to consider them here, when more effectuous measures are free from all objections.

Bad Nauheim and Schott have been advertised by his friends and votaries for the music and pleasures of the spa, and the carbonated baths and exercise. While these things possess merit, they are no substitutes for d'Arsonvalization. If the records of results are compared the latter far exceeds the benefits derived from Schott's methods, and they may be taken at all seasons of the year at home. During the winter months, when advanced cases of arterio-sclerosis invariably develop the highest arterial tension our people do not find it convenient to spend their time abroad, and why should they, when d'Arsonvalization at home assures them safety and better conditions than foreign spas can offer?

The auto-condensation method of treatment of hypertension is one of the most valuable additions to the materia medica, and is, we regret to say, at present ignored by the bulk of the medi-

cal profession, who have not discovered its great value. No other thing except judicious living in the matter of foods from youth up is so capable of lengthening the span of life as the scientifically administered high frequency current.

Auto-condensation may be administered with little discrimination when hypertension is present. It has been said that hypertension is generally compensatory, which our experience shows to be an error. Experience for more than five years in the constant employment of the method leads the writer to make the following observations: (1) d'Arsonvalization in therapeutic doses does not depress the heart even in aged people in whom it is impossible to reduce the tension. (2) It is indicated in all cases except parenchymatous nephritis at least as a trial measure. (3) In most other cases except of parenchymatous nephritis if the tension is compensatory, the tension will promptly return. (4) *In parenchymatous nephritis* to lower arterial tension is a serious matter because high tension is necessary to force the circulation through the kidney, that all possible nitrogenous waste eliminations may be effected; (5) hypertension arising from toxæmia and as associated with arterio-sclerosis is most successfully reduced except in general sclerosis, and satisfactorily controlled by the auto-condensation method of d'Arsonval.

The auto-condensation method has been administered with uniform success, employing the couch with a current of 400 to 500 ma. for 12 minutes daily, or upon alternate days, or less frequently according to indications.

The diet is in all cases restricted in accordance with the principles previously stated.

Exercise should always be regulated to the food taken, and to other conditions of individual cases. With all persons in whom arterial hypertension is reduced below 150 mm. exercise is indicated. In the young and middle aged this should be fairly vigorous, and in those past middle age regulated to individual indications.

There is no work in therapeutics that gives greater satisfaction to the physician who intelligently employs the methods here described in the treatment of cardio-vascular diseases and no class of patients who are more grateful than the sufferers of mature years whose lives are saved and rendered more com-

fortable by these methods. It is a boon to the afflicted and a source of great satisfaction to the physician.

Discussion.

Dr. Anthony Bassler of New York. I believe that Dr. Snow has covered the subject of the therapeutics of hypertension cases most perfectly from the standpoint of the clinician. I was very glad to hear him preface his remarks by the statement that toxemia from the gastro-intestinal canal had much to do with the production of these conditions, because undoubtedly it is true that it has more to do with it than all the other factors put together. I wish to confirm what he has stated in the way of the plans of treatment.

However, I would like to speak a few moments regarding the importance that he placed upon the diet. We have all of us to recognize the practical fact that there is no virtue in any medicinal measure, such as calomel and beta-naphthol, and so on, as an intestinal antiseptic, regarding which the best is accomplished by purgation and the use of calomel in small doses. But it is a strange thing in these cases, as well as in other putrefactive gut conditions, that when, for instance, the proteins are being broken down and putrefied, with the production of the indoxyl sulphates, which are the main factors in the production of the irritation of the intima of the arteries, and you place these patients upon a non-proteid diet for a while, invariably they are improved. It seems, however, when you continue the diet, that the bacteria which have been putrefying the food in the first instance, have the facultative quality of attacking the diet that is then used. There is always more or less protein in starchy matter, sugar, etc., and they will break down these substances and adapt themselves to the condition of diet and the putrefaction will continue. Then, strangely, if you quickly change to protein diet, which was manifestly contraindicated in the first instance, the patient improves again for a length of time, only to slide back again into the same condition of affairs that you noticed in the first instance with a non-protein diet.

The time is coming, gentlemen, when the bacteriology of the intestinal canal has got to be taken into consideration as the most important factor in the production of hypertension, arterio-capillary sclerosis, as well as chronic nephritis, myocarditis and the other conditions of the reno-cardiac system and their associations.

It is a big subject, and I simply wish to state this, that regarding the diet, it has always appealed to me that the most important point in the diet is that whatever foods are used—and they may be general in their selection—that such foods should be limited in quantity, very well cooked, the vegetables,

for instance, mashed, the meats finely comminuted, all foods thoroughly masticated, preferably small quantities taken at a time at shorter intervals than the ordinary three times a day meal, for the reason that when foods are taken under these conditions they are digested much more thoroughly and less non-digested food of a proteid and non-proteid type passes through the ileo-cecal valve for accumulation in the colon where these bacteria are at work.

I have seen a number of patients that have been treated by various measures, including the auto-condensation method, and I must say that as a means of reducing hypertension it is *par excellence*, but I must also say that if the bacteriology of the intestinal canal—and these cases are so often chronic—is not attended to the hypertension will return. You cannot keep it up all the time, and, on the other hand, when cases are studied along these lines and the bacteriology is practically established on a normal basis so that the putrefactive fermentation elements are negative, the hypertension falls without further treatment, and it is a surprising thing that when it does fall under these conditions the patients become as weak as a rag. They seem to lose the stimulation and force that comes with toxemia, but, of course, only for the time being; and also when this bacteriology is changed the body continues it along as a substantial condition. With reasonable diet patients then have very little trouble. I have my serious doubts that where real sclerosis is accomplished as a positive thing in the intima of the vessels, that any treatment is curative in any sense. I do believe, however, that the bacterial methods of treatment of the intestinal canal, which is specific work, does tend to prevent a continuation and certainly prolongs the life of these individuals.

Dr. S. G. Slaughter of Lynchburg, Va.: I put my patients on one meat at a meal, and just as much of that one meat as they wish. Under meat I include meat, milk, eggs. I never mix them. Of the starchy foods I allow just one, rice, potatoes or bread. They can have vegetables and salads. I cut off everything that would increase the appetite, such as pepper. I find that they gain in strength, and in a very little while the putrefactive changes disappear, as far as I can judge from the chemical examination I can make.

Dr. G. B. Massey of Philadelphia: I was particularly interested in Dr. Bassler's statement that we must come to know our bacteriology in these cases, and in this connection I want to speak of the use of the betanaphtholate of bismuth in these cases. A good many of you know of that drug doubtless, but you may not be using the correct thing, if you employ it in tablet form. The true betanaphtholate of bismuth is not made in this country, but in Germany. It is on the market under the name of Orphol. It is expensive, a dollar an ounce, and a patient really ought to take an ounce a week, in half teaspoonful doses before

breakfast. It is said that this insoluble drug does not kill the germs, but simply inhibits their growth. The patient has to take it for a year if it is a pronounced case of auto-intoxication with interitis.

Dr. B. S. Price of New York: Dr. Bassler spoke of the bacteriology. There are so many of those bugs there that we cannot get rid of them. All we can do is to build up the cells, wash them out, and try to keep up our own lines of defense. It is not so much a matter of just how many bacilli there are in our colon as it is a question whether they can get through to the other side of the intestinal wall, and that depends upon our own vitality. Dr. Snow did not speak merely of using auto-condensation for the purpose of reducing blood pressure and so preventing the trouble, but he included with that the general eliminative processes, and that covers the whole thing. We must eliminate, not merely from the alimentary tract, but the various glands, particularly the liver, and that is where most of the trouble starts. For years in chronic cases an enormous amount of intestinal sepsis continues before the individual knows that there is anything wrong with him. In other words, his lines of defense are quite sufficient to prevent absorption. As soon as our own laboratories are overcrowded and our own resistance is reduced, just that soon a man begins not only to suffer from intestinal sepsis, but reabsorption. Changing the food alone, as Dr. Bassler says, does not help that. We might leave out all the proteids, and what he says is true, that in a little while these bacilli will readjust themselves to their new environment and will feed on the new food. It is a matter, then, of flushing them out and at the same time of clearing out as far as possible, and if it is not possible we will never produce a cure—the poison that we have already in our own tissues, and once we can do that then our own resistance prevents further absorption. A mixed diet is all right—any diet that is reasonable and rational. Our food for some time does make a difference, but when it does make a difference it is not a reduction of the proteids, but it is introducing as far as possible a very large amount of the farinaceous foods which have been conclusively proved to be the best food for the prevention of the anaerobic propagation of the colon.

Dr. Gustave Werber of Washington, D. C.: I have used the glycerite of naphthol in these cases, flushing out the colon with it and also using it by the mouth. It has the advantage of being very cheap. I use it in one or two per cent. solution.

Dr. Massey: Is it soluble?

Dr. Werber: Yes, it is soluble.

Dr. Massey: That is a disadvantage. The drug I spoke of is absolutely insoluble.

Dr. Werber: I have generally used it in washing out the colon. The manufacturer represents it as non-poisonous. J

don't see how it can kill the germs and not be poisonous. It is especially good in Rigg's disease. It is highly alkaline and neutralizes to a large extent the troublesome condition around the gums.

Dr. R. D. Baker of Summit, N. J.: In reference to Dr. Price's remarks about the bacteria of the intestinal canal, I would like to say that I do not consider that it is the bacteria that we have to fear or deal with outside of the intestinal tract. The walls of the intestine when they are healthy do not allow the passage of organisms. It is the putrefactive products that are formed by the activity of the bacteria that we have to deal with, and the inability of the liver to take care of these products. Now if we can conceive a means of bringing about in the intestinal tract a natural flora, a flora that will form toxic products only in amounts that we can take care of and make non-toxic, in that way we would get the ideal treatment of this disease. In using vaccine methods devised by Dr. Bassler that result is possible. The number of the bacteria is brought to approximately a normal proportion, and the formation of toxic products, such as phenol, sulphur products, indol, etc., is brought to the normal limit and then converted in the liver.

Dr. Bassler: I would like to say just a word in regard to the use of a farinaceous diet. The bacterium that is responsible for ninety per cent. of the indolic putrefaction in the intestines is the bacillus coli communis of the various strains. Now, if you make a culture containing dextrose or glucose sugar and also peptones and you inoculate this culture with the bacillus coli communis, they will not attack the proteids at all. Their first attack is upon the sugar. They will reduce the sugar, producing carbon dioxide gas and butyric acid and so on, and when they have reduced the sugar they will then attack the proteids, and always only slightly. Now if you put the coli in only a proteid culture they will attack the proteid to a very little extent. It is, therefore, true that the assertion that a farinaceous diet has a preference in these cases to a mixed diet is based upon an erroneous assumption, because these anaerobic bacteria, if they have a preference in the selection of foods, will select carbohydrates in preference to the proteids every time, and it is after they have fermented the carbohydrates that they will attack the proteids, and strange, when they have done this through the carbohydrates, they have prepared the way for the reduction of the proteids into toxic molecules very much quicker and easier than if the farinaceous material was not present with the proteid at the same time. There is virtue in the Salisbury beefsteak and water diet in the treatment of some of these cases, but not in the majority.

I merely wish to defend the protein side of the question, and say that the mixed diet is the best one, with limited quantities of food. The latter is the important point.

Dr. F. Howard Humphris of London: In Brussels we had no hesitation whatever in putting a patient on *le diet absolu*, which means nothing but water for twenty-one days. Even in typhoid cases we rarely got heart complications. Our percentage of deaths compared not unfavorably with that of other capitals in the world.

Dr. Snow in closing: I am very glad that the paper has brought out the discussion of the particular point—the processes in the alimentary canal, for that was the burden of my thought in preparing the paper, that we were dealing in all of these conditions with alimentary disturbances. If you remember, in my remarks I emphasized very much the idea of the last speaker, *i. e.*, to as far as possible and for a long time put the patient on a conservative and limited diet besides cleaning out the alimentary canal. Patients in acute stages will live on with little or no food surprisingly well for a considerable time.

Dr. Price amplified upon my reference to another important point in the treatment of these cases; viz., the promotion of the elimination of toxins by the use of a great deal of heat, light and other measures which promote elimination. I had stated that the diet, after the first prolonged fast in acute toxemias should be for a considerable time. In fact, a moderate diet should be continued indefinitely in order, as far as possible, to keep the medium for the development of the bacteria at the lowest possible limit, when there was certain to be a lessened toxemia. It is not uncommon for patients so restrained to gain in weight on the moderate diet, which is a certain indication that the average individual is eating very far in excess of his physiological demands. Here I think is the great cause of autointoxication—the pronounced habit of a well fed race at the table overfilling themselves. I inferred from Dr. Bassler's remarks that he might have understood me to say that these cases of high tension in old people were cured. I do not think that to be possible, but I do think that if we restrict their diet and keep the blood pressure down, the process is practically at a *status quo*, which is equivalent to lengthening the life of the individual, so long as we may keep the pressure below the danger point. I feel that it is our duty as physicians to control both horns of the dilemma, keep the blood pressure at a safe point, and cut down the quantity and regulate the quality of foods. If we do this, the process will be arrested and life prolonged.

STATIC ELECTRICITY IN NERVOUS AND MENTAL DISEASES.*

J. JOS. KINDRED, M.D., RIVERCREST, ASTORIA, L. I.

Mr. President and fellow members of American Electro-Therapeutic Association

Let me say in the beginning that until about twelve years ago I was, like so many physicians in this and other countries, an avowed sceptic, being "from Missouri," as to whether electricity applied in any form to healing had any efficacy at all, except possibly a remote psychic influence on persons very susceptible to suggestion and suggestive therapeutics. In this state of almost prejudiced scepticism, my attention was called by Dr. Wm. Benham Snow and others associated with the N. Y. Post Graduate School of Medicine to certain interesting phenomena, which had been developed by their investigations in this line, and I became, almost against my will, convinced that the application of electrotherapy was promptly followed by very definite and beneficial physiological action in many diseased conditions of the human body. On further personal investigation I was more than satisfied that in some diseases it was the only agent in all our varied armamentarium that could possibly bring about relief or cure. While, of course, interested in other forms of electrotherapy, I became particularly impressed with the static machine because of its many practical uses, wide field of application, and great curative results; and in referring to my work chiefly with this particular modality in selected cases, among many thousands of insane, nervous, alcoholic and drug patients I have seen in my connection with several public hospitals in this country and Europe and in my own private sanitarium work, I do not wish to appear as boastful but only as trying to demonstrate proof of the faith I now personally have in the intelligent, conservative use of all forms of legitimate electrotherapy in suitable cases. My own work, as stated, being confined mainly to certain applications of the static machine, I approach this whole subject not with over-self confidence in my own limited efforts, but rather with admiration for the abundant, fruitful work in the whole diverse field of electro-therapy, of such scientific men as Prof. Wm. J. Morton, Dr. DeKraft, our President; Dr. Wm. Benham Snow, Dr. G. Betton Massey of this city; Dr. Edward C. Titus, and many others.

Among the illustrious galaxy of stars in the firmament of electro-therapeutic research, who have indeed given a new impetus to newer, broader principles of therapy, which had their original and humble beginnings in the discoveries of our

*Read before the Twenty-first Annual Meeting of the American Electro-Therapeutic Association, September 5, 1911, at the College of Physicians, Philadelphia, Pa.

own American statesman and savant, Benj. Franklin, and in the practical application of sparks to cure disease by the Abbe Nollet in France, in 1734, and (in Charcot's time) of the French clinician, Vigoreux. But it was left to Prof. Morton (who in 1881 introduced the first influence machine to this country) and in recent times to the indefatigable clinical labors and many contributions of our own colleague, Dr. Snow, to bring these valuable agencies to the forefront in our modern therapeutics.

Before taking up those cases and their symptoms or groups of symptoms with which sanitarium and other physicians are in daily contact (especially the symptoms or group symptom of pain), I will refer briefly to some physiological actions of the static wave current, the static sparks, and the breeze and brush discharge as being the basis for the intelligent consideration of the work that I am to report. In the main, I accept the elaborate principles laid down in Dr. Snow's latest book, fresh from the press on "High-Potential and High-Frequency Currents," including his views as to the actions, local and general, of these agencies in favorably influencing metabolism and, by inference, from what he says of their power to lessen congestion and hyperemia, I take it that he claims, what I also claim, that they cure many nervous and mental conditions because they bring about a physiological equalization of blood circulation, this being the basic principle on which most chronic nervous and other cases are to be cured, if cured at all. This, I believe, has been abundantly demonstrated by the employment of these agencies as well as modern scientific hydrotherapy, as by Prof. Baruch, in removing hyperemia of the cerebro spinal system and other tissues, especially in alcoholic and drug habituation.

Accepting also, with modifications, the claims of Dr. Snow that these agencies cause stimulation and sedation by controlling local inflammation as well as general hyperemia and congestion, I would suggest that there is a parallel in the physiological action of these applications of the static machine and certain applications of modern hydrotherapy, and that the basis for this similar physiological action is due to the fact that both agents produce their effects by vibration and small-shock-action on the surface of the body, that is, on the peripheral nervous system, thereby bringing about a distinct physiological action upon the higher cerebro-spinal centers; the impressions being received through the medium of the peripheral nervous system and the afferent system.

The nutritional effects of the one-pole currents charging and discharging through the body, due to peculiar activities in the higher cell protoplasm, and also causing increased glandular secretion and elimination, and also the interesting effects of this current in causing a feeble person who had

been chilled to warm up in a room in which the temperature was 30 degrees Fahrenheit—all go to prove its decided physiological action on the higher nutritional and heat centers of the cerebro spinal system.

Its stimulating and secondarily sedative, anodyne effects, both local and systemic, and its curative action on localized inflammatory areas, make it superior to other treatment in many painful conditions, whether or not dependent upon general conditions or local reflex inflammatory conditions, as in neuralgia, sciatica, neuritis, and myalgia, and also in rheumatism, rheumatoid arthritis, gout, migraine and certain headaches, whether caused or not by gastro-intestinal disorders or so-called rheumatic diatheses. Other treatment, according to the peculiarities of each case, being also indicated; for instance, dietetic regulation in proper cases. It is just as important to prescribe red, rare roast beef in some anæmic, sciatic, neuralgic, and rheumatoid arthritis cases with poor nutrition, as it is to prohibit it in the same cases who are over nourished and full-blooded.

The complex symptom, nervous instability and also the vaguely expressed conditions of general nervous inertia or "brain fag" or so-called "Americanitis," because of the physiological effects mentioned, should be systematically treated with the tonic wave current, this applying also to neurasthenia.

Other painful conditions to be treated by this method are cases of alcoholic and drug habituation recovering from the effects of the poison and the withdrawal of it in the course of treatment. In connection with the administration of morphine or sedatives by physicians for relieving pain, it should be borne in mind that many drug habitues applying to sanitarium for treatment give a history of having gotten in the narcotic habit through the administration by physicians of the drug to temporarily relieve pain that can be rationally better relieved by the wave current or static sparks.

Because of the very wide scope of my subject and the lack of time, my references in this paper to electrical methods, technique, electrodes, dosage, etc., in individual cases, will be general, and likewise my references to cases and classifications of cases will also be general rather than to numerous individual clinical cases. The only exceptions here as not treated with the static machine are certain high-blood pressure cases treated by the effective current of Prof. d'Arsonval.

In anterior poliomyelitis the wave current should be administered along the spine, using a narrow metal electrode over the segments of the cord involved, to produce stimulation and nutrition of the degenerated cells, together with radiant heat and light during the acute stages, for required elimination of the poison of this undoubtedly infectious dis-

ease, using a sufficiently long spark-gap. To avoid atrophy of affected groups of muscles, I advise the use of the mechanical vibratory effect of the wave current, with a proper electrode daily for two or three weeks at a time, with massage at intervals and other general measures as indicated. Even in cases of gummata or other conditions of intra-cranial or intra-spinal pressure, although the syphilitic basis of gumma calls for mercury and iodides, the wave current has its good effects, except where surgical interference is necessary.

Tabes dorsalis cases are decidedly benefited by the employment of these currents in full dosage given for twenty minutes daily for periods of two or three weeks for their tonic and nutritional effects, along with Fraenkel's exercises and the specific treatment, if indicated. There is no more effective method than this to relieve the pains, girdle sensations and bladder complications so often accompanying this disease. The static wave current should be given during the paroxysms along the spine, over the seat of pain, with a long, narrow electrode. To stimulate the more or less paralyzed bladder, appropriate electrodes should be used either over the pubis or in the rectum.

There are several painful mental states in which the wave current also acts as a combined tonic and anodyne, notably in mild, pure melancholias, and also in hypochondriasis with or without delusions, and in other pure psychoses marked by a painful mental state or psychalgia, to use a word coined by the great alienist, Prof. Clouston, of the University of Edinburgh, one of whose students I had the honor to be.

Dementia praecox, a progressive deteriorative mental disease occurring during adolescence between the ages of 18 and 35 years, the differential diagnosis of which should be easy by the experienced alienist, has been treated, it has been claimed with success by some, with electro static methods, but I have seen no permanently good results in this disease as in the more unfavorable cases (and the majority of them are considered incurable by the best authorities), there is rather rapid and profound deterioration and extinction of the higher mental and moral qualities. I have seen as good results from the few cases in which vasectomy was practiced to prevent or lessen the wild sexual excitement and masturbation so often exhibited, as from any other method of treatment not included in the usual sanitarium routine methods.

Vasectomy about which there is at present so much difference of opinion in the State of California and other states in which the law has enforced this operation upon certain male criminal and insane persons is as you know a simple surgical procedure by which the surgeon reaches the back of the bladder and ties off the seminal vesicles, thus effectually preventing the escape of seminal fluid and the possibility of procrea-

tion and also the effect of lessening sexual activity and masturbation. Whatever may be our views on this subject as moralists and social-economists and whatever may be the blow struck here to the inalienable personal rights of the individual, guaranteed to him by the constitution of the United States, it is certainly true that a severe blow is struck at the seminal vesicles, and their power to procreate and perpetuate in the world a race of insane and criminals.

Most brilliant results have been obtained from both the application of the wave current and the d'Arsonval methods in hypertension, with and without accompanying atheroma of the blood vessels or arterio-sclerosis in different stages. The static current should be used in the earliest stages for twenty minutes daily for the peculiar constitutional effect in this disease and the treatment persevered in, along with mild tonic applications of hydrotherapy twice or three times weekly, and also mercury and iodides if indicated. I use in these and other cases requiring the general effects of the wave current, a long electrode connected with the positive pole, lightly applied to the surface along the upper cervical vertebrae.

It is a curious and unexplained fact that in some cases of abnormal blood pressure of the same classification, especially in very high pressure not accompanied with ascertainable degeneration of the blood vessels, the static wave current gives better results, and in others decidedly better results are obtained from the d'Arsonval apparatus, employing auto-conduction and auto-condensation.

Hypertension and arterio-sclerosis, of increasing frequency during these days of strenuous and high living, can be controlled better by these agencies and by radiant heat and light and hydrotherapy than by any other treatment, except, of course, the necessary dietetic rules which must accompany, in given cases, all treatment.

But the most brilliant results of all have in my hands, been obtained with the static machine in that ever increasing disease, neurasthenia, attacking so many over-worked American business men and women, with its multitudinous causes and multitudinous symptoms, which in some forms make its differential diagnosis difficult from the depressed stages of certain mental diseases like general paresis.

Here the static machine and Baruch's modern hydrotherapy constitute the "sheet anchor" of treatment, hydrotherapy being given mildly twice a week in addition to the wave current, the latter with a long metal electrode lightly applied along the surface over the cervical vertebrae. This should be given daily, except on the days when hydrotherapy is administered, for a period of many weeks along with graduated exercise or the modified Weir Mitchell cure, according to the needs of the case. Many of these cases with poor nu-

trition also require the so-called over-feeding with nutritious proteid food.

What has just been said of the treatment of neurasthenia in its many forms, particularly applies to the treatment of prostatitis of aged men with neurasthenic symptoms, an appropriate electrode being here used that will reach the prostate with a mild wave current. I have not myself treated any prostate cases by this method, but from personal knowledge of such cases thus treated I am convinced that this is in most cases better than surgical or other procedures.

If I were placed in the position to be compelled to make my choice between electrotherapy and hydrotherapy and physiotherapy on the one hand and drugs and all other medical measures put together on the other hand, I would by all means choose up-to-date electrotherapy and hydrotherapy in the treatment of neurasthenic conditions.

For the shortcomings of my paper on this broad and important subject, I must beg your indulgence and as an excuse, urge the fact of my pressing private and public duties during the past few months.

Rivercrest Sanitarium.

Discussion.

Dr. William B. Snow, of New York. I wish to thank Dr. Kindred for his mention of my methods. I must correct him, however, as to my experience in the treatment of dementia precox, which is limited to two cases, both of whom were young men with enlarged prostates. As Dr. Kindred has not treated the prostate in these cases, I suggest that in male neurasthenics and dementias it be made routine practice to examine the prostate gland. He will not find the prostate enlarged in all cases, but in the cases in which it is enlarged he will see remarkable results from the treatment of the gland with the wave current. In my own record of more than 160 cases of prostatitis, I have the following findings: 75 per cent. of my cases of neurasthenia in the male had prostatitis, and 25 per cent. of all my prostatic cases are victims of neurasthenia.

Dr. Kindred (in closing): Let me say by way of counter-explanation that some of the cases which I referred to as having personal knowledge of, as having been treated by this method, were cases which Dr. Snow successfully treated. He did not know that I had sent him some of them. I have reason to believe, not from anything I have heard him say or anything he has published, that he has had most satisfactory results in these prostatic cases accompanied with neurasthenic symptoms. I shall avail myself of Dr. Snow's suggestion to examine the prostate in some of my dementia precox cases in the future.

EXPERIENCES OF A PIONEER ELECTRO-THERAPEUTIST IN MISSISSIPPI.

BY ROSA WISS, M. D., MERIDIAN, MISS.

In coming before this Association with a paper, I would not have any member think for a moment that I am trying to teach you or bring to you anything new. I only wish to report the work done by a very humble member who has, to the best of her ability, done the work of an electro-therapeutist in a new field.

The success attained by me in this work has been far beyond my brightest expectations, and to the uninitiated has often seemed like magic. This success, I know, is due to the fact that I have carried out most conscientiously the careful instructions of our Dr. Massey, who so patiently taught me the work. To this, our true pioneer, who has had to suffer the hardships of a real pioneer, I lovingly and gratefully give the praise for my success.

From earliest infancy all things electrical have had for me a most wonderful fascination, but, remembering that "fools rush in where angels fear to tread," for years my progress was very slow. During the first eleven years of my practice all the electrical outfit I possessed was a small one called a Faradic battery. But to-day as I look back on those years I do not feel that they were wasted. It would surprise some of you to know how many things I learned with that small outfit. Then, too, it is a great satisfaction to know now that, with that simple, harmless little thing, coupled with a lot of hard study along the lines of the physics of electricity, the period of my electrical dentition was passed without harm to my patients.

Five years ago, my pocketbook having become a little heavier than of yore, I decided to buy a wall cabinet, and go more deeply into the work. But here again my courage failed me, and I felt that before I gave one single treatment from that wall plate I must study with Dr. Massey. This was indeed a happy summer for me, but it was pretty tough on poor Dr. Massey. He had no other pupil at the time, and I made good use of every minute, asking him a thousand questions, and watching his every movement during a treatment or an operation. The more I saw of the work the more I became fascinated with it. Looking back on that summer I wonder how even Dr. Massey with all his patience, ever endured me.

On beginning my study with Dr. Massey I told him I was not interested in cancer work, and that I did not believe any one could cure a fibroid with electricity. I told him I didn't want to waste my time on these things, but wanted to learn enough about the direct and induced current to treat my gynecological cases. He calmly looked me in the face and said if any one said

he could not cure a fibroid with electricity they lied, and he would prove it to me. As for the cancer work he said: "When you finish your work under me at the Oncologic Hospital you will be interested in cancers." Needless to say he had his way.

My work over with Dr. Massey, I returned to my home, Meridian, Miss., my new outfit reaching there about the same time I did. Then I began to know what it was to be a pioneer. There was not an electrician in our town who had ever seen a wall plate, much less put one up. Then, too, I wanted to change up the wall plate I had gotten, and put in, in place of the small rheostat, a graphite controller and put in a Weston milliamperemeter. Coupled with this, I had to contend with dry cells, as we had only the alternating current and at that time I had no transformer. During the days we were working on this outfit many of my doctor friends would gather in the office, and, with amused looks ask me when I was going to do a "cataleptic" operation. Some openly sneered, while others looked sorry for me, and I, being like Georgiana Wilfer of Dickens' fame, and not wishing to be "poored by Pa," or anyone else, found the latter even more objectionable than the former.

At last the work of putting up the outfit was over, and everything working fine. To my consternation one of the first cases to come was an epithelioma of the lip. This case was brought by our leading surgeon with a request that I do a major cataphoric operation. In my heart of hearts I longed for Dr. Massey, and oh! how glad I was he had made me become interested in cancer work. I did not, however, let anyone know how I dreaded to do this, the first major ionic operation ever done in the State of Mississippi. It was witnessed by a number of our leading physicians, and as good fortune would have it for me, was a perfect success. A large part of the lower lip had to be removed, but the scar has since filled in so that the deformity is nothing like what would have been expected from such a large operation. Nearly five years have elapsed since I did this operation, and there is no sign of return. The patient's health has improved. She belongs to a prominent family in our city, so the case was observed by many. Needless to say its very favorable termination did much towards hushing the criticisms of the prejudiced and skeptical among my fellow practitioners.

A short time after I had performed this my first major ionic operation, and was still in mortal terror of a failure, a prominent woman from a nearby town presented herself at my office. She was the possessor of one of the biggest uterine fibroids I had ever seen. Frequent and very severe hemorrhages for the past few months had rendered her almost bloodless. Anemia had caused such severe headaches and dizziness that she would

not trust herself to walk across the street without assistance. She knew nothing about electricity. Dreading the awful storm of criticism which I knew would assail me from the surgical world if I dared offer any other than surgical treatment for a fibroid, I did not tell her anything about electricity, but told her that she would surely die in a short time from hemorrhages if she did not go to the hospital and let them take out the tumor. Her anemic condition and the vast amount of adhesions I knew to be present from the fixed condition of the tumor made me sorry for the surgeon who would take the case.

However, I did not commit my fears to her, but put the best face on it, telling her of the vast number of women who had successfully undergone the operation. This had no effect on her. She calmly said she would die rather than be cut. Her husband then asked me if I couldn't give her some palliative to make life more endurable. Thus pushed to the wall I told him of the possibilities of relief with electricity. The wife was told of the great pain she might have from the treatment and of the length of time and cost of treatment. She gladly accepted anything if I would not chloroform her or cut her.

To make a long story short, she began treatment at once. In less than six weeks she was relieved of the awful hemorrhages, her monthly periods coming at regular intervals of four weeks, and, while profuse, they were never so free as to cause alarm. The tumor began very soon to decrease in size, and she to put on flesh. In less than six months her health had so improved that her friends scarcely knew her as the same person. On July 29, 1911, I made a careful examination and no tumor could be found. I don't know what became of the adhesions. The only thing I did for her besides giving the treatment for fibroid as laid down by Dr. Massey in his "Conservative Gynecology" was to give her by mouth 20 m. of adrenalin chloride every two hours during the day and an occasional dose at night for the first few weeks. After that, her condition having so improved, I only gave the adrenalin a day or so before the expected menstrual period, and during the period. This was kept up for about six months.

During the first year she was treated three times a week, but after that only about once or twice a month, and towards the latter part of the time once in two or three months. I used the copper electrodes amalgamated with mercury. For the first few months the treatments were intrauterine, but after that vaginal treatment with the large copper ball amalgamated with mercury was used. At each treatment I gave 100 milliamperes of the direct current for five minutes, followed by twenty minutes of primary induced. Whether the adrenalin had anything to do with curing her or not I do not know, but I think it greatly hastened matters. I am sure it helped in the control

of the hemorrhage, as we noticed a marked increase in bleeding a few times when it was left off.

Another very interesting feature in this case was the improved liver action. Previous to the treatment she had always been of a very (as we of the South express it) bilious temperament, requiring large and frequent doses of calomel. This has all been relieved, and she has not had to take any calomel since the first few weeks of treatment. In the light of recent investigation along the lines of ionic medication may we explain this? In many other cases of menorrhagia, metrorrhagia, etc., where I have had to use the positive pole with the copper mercury electrode, a similar result has followed.

During the first few months of treatment of the fibroid, as I expected, I met a storm of adverse criticism from the surgical world, but this only made it better for me when the case turned out so well. Then I realized that "He laughs best who laughs last."

These two cases did much to establish me in my work. The doctors stopped scorning me and the laity never stopped to think whether it was a fibroid or a cancer that was the matter, they just felt that if I could cure such things as that I could do anything, so the cases came galore, menorrhagia, metrorrhagia, amenorrhea, dysmenorrhea, neurasthenia, rheumatism, etc.

I have not gone crazy on electricity, but am striving to be a doctor of the old school, using what my patients need. If I find they need drugs I give them drugs; if they need local treatment I give them local treatment; if an operation I do it, or have it done. But I feel after sixteen years of hard work and study I have at last found in electricity the most universally helpful means of treatment.

Until the last year my work has been exclusively with the direct and induced current. I am now doing some high frequency work, but as yet have nothing to report along that line.

Discussion.

Dr. G. B. Massey, Philadelphia: These clear statements of experiences are very valuable in these meetings. If the doctor had treated these cases here before us she could not have given us a clearer picture. I congratulate her on her success. Reading between the lines, one can see a personal element here of a woman doctor in the South who has overcome opposition in her own neighborhood, entirely independent of the opposition that might have come to her from the modalities and methods that she took up. I feel that the doctor will be a valuable member in our Association.

Progress in Physical Therapeutics.

GYNECOLOGY AND ELECTRO-CHEMICAL SURGERY.

EDITED BY G. BETTON MASSEY, M.D.

The Destruction of Moles and Warts by High Frequency Currents.

Dr. William L. Clark of Philadelphia sends the following letter :

Dear Doctor.—I read your article upon “The Virtue of Electro-Chemistry in Warts and Moles” in the September issue of THE JOURNAL OF ADVANCED THERAPEUTICS. I was surprised at the departure from your usual fairness and accuracy of expression, and I must take issue with you upon some of the statements contained therein. You state “A physician (?) practicing exclusively as a chiropodist, recently applied to you for instruction in the electro-chemical treatment of small neoplasms of the feet, saying that he had been advised to use high frequency for this purpose, had procured an outfit and tried it, but that he had totally failed to destroy the warts, or materially affect them.” This simply proves that your student either had a worthless apparatus, or was ignorant how to apply the current. Physicians seeking accurate information might form an unjust opinion of the value of these currents from your editorial.

You said “An eight hundred dollar machine would have destroyed these warts, though the writer believes more skill to avoid scarring would have been required than that necessary in the use of a plain fifty dollar constant current outfit.” You doubtless refer to a high speed static machine.

I agree with you that it would be absurd to acquire an eight hundred dollar apparatus to destroy warts alone, and anyone would be foolish to do so, but you failed to mention the large neoplasms that may be effectively destroyed with the properly balanced current from this apparatus, and also the other uses to which this machine may be applied. I refer to the whole range of static currents, the x-ray, together with all high frequency currents. The fact that you have recently procured for your hospital an apparatus similar to the one to which you referred, seems to indicate that you have altered your opinion since writing the editorial.

So far as destroying simple warts is concerned, even a fifty dollar constant current outfit is not necessary, for it can be perfectly well done with a small twenty-five dollar high frequency

outfit, if properly balanced and applied correctly. Of course, this does not apply to larger growths.

I do not agree with you that there is less scarring with electrolysis than with the high frequency desiccation current. Experience with one thousand warts and moles treated by the desiccation method has yet to show any undesirable cosmetic result. I have had an opportunity of observing many cases treated by electrolysis, where in many instances the scarring has been pronounced, and I may say the work was done by competent men. It is not my belief, but my knowledge that there is less scarring by the desiccation method than by electrolysis, for the obvious reason that by the former the destruction is from without inward and subject to great refinement of control, while by the latter the destruction is from within outward, with less perfect control.

I think that a fair discussion of the merits of different methods designed to best accomplish the same end is always welcome to those interested, but surely a correct conclusion could not be drawn from your editorial.

Yours truly,

W. L. CLARK.

Dr. Clark's criticism is in some respects just, for the Editor of this Department is informed by others as well as Dr. Clark that the small high frequency apparatus will successfully destroy warts and moles, not to mention the large apparatus that he uses for the desiccative destruction of those and larger growths. It is true also that the hospital with which the writer is connected is about to purchase a machine to test the value of desiccative destruction of neoplasms and for other uses, in its effort to test all methods of treating cancer. It would be manifestly incorrect to conclude from the editorial remarks that the failure of this student to get destructive effects in warts on the soles of the foot from the cheaper apparatus means that a more skilled physician would also fail with the cheaper apparatus, and I am, therefore, glad that this criticism has been made.

The idea intended to be conveyed by the editorial was a protest against the use of the less controllable modality, high frequency, in the destruction of small benign moles and warts, as compared with the negative needle of the constant current, even when both were effective for the reason that the high frequency current when effective is far more difficult of limitation in action. With a fine needle, curved at the point, from 1 to 2 milliamperes, negative, will dissolve the matrix of the errant cells of the benign growth in a few moments without risk to the structure of the skin and consequently without leaving a scar. In the instances of high frequency destruction noted by me the whole thickness of the skin was necrosed, leaving a small scar.

It is possible, however, that this is not usually so. The pain, I may say, appears to be the same with each. I do not think that one who has used the ordinary electro-chemistry of the negative needle in the destruction of moles on the face of a woman would think of using a less controllable agency when the former is both perfect in action and absolutely under control, and it was naturally astonishing to the writer that a chiropodist should be advised to turn his back on an established and perfect art to try a new method, for it should be remembered that the chiropodist had no other use for the apparatus than the removal of these warts and moles. It is even possible that a so-called wart on the sole of the foot cannot be readily destroyed by high frequency on account of the thick epidermis overlying the sensitive, morbidly developed papilla. The negative needle inserted beneath the epidermis parallel to the skin was quickly successful.

Reverting to the question of the comparative scarring of electrolysis and the high frequency destruction, I am sure that Dr. Clark is alluding to the scars of ionic surgery that he has seen when he says they were pronounced. This is an entirely different matter. The zinc-mercury ions that are drawn in to destroy malignant growths, however small, are driven deeply into the skin and subdermic tissues, regardless of cosmetic effect, and a scar almost always results, though this is frequently surprisingly small considering the size of the wound.

These questions are of practical value, and all possible light should be thrown on them, with a comparison of experiences when possible.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M.D.

The Present Position of the X-Ray and Radium Treatment in Malignant Disease. (By Edward Reginald Morton, M.D., F.R.C.S., Edinburgh.)

He first devotes attention to the consideration of technique. He ascribes the action of the x-ray to the effect upon the aggregation of normal and abnormal cells, stating that it is generally admitted that the latter have a lower vitality and resisting power than the former, and are found to be more easy to destroy, the aim being to so adjust the dose of whatever agent is used that the normal cells are not seriously injured, while the abnormal cells are damaged beyond recovery. He attributes the failure often to obtain complete cure of malignant conditions to the fact that the active rays are often absorbed and spent within the first half-inch from the surface; whereas when most cases come under observations in an inoperable stage, "we

are unable to reach efficiently that part of the growth that really matters—the deep or inner advancing margin.”

He cites a case of a married woman, 40 years of age, in whom after the removal of her left breast, recurrence had set in almost immediately, and after five months the part was swollen to almost the size of the normal breast on the opposite side. In this case he decided to adopt heroic measures, and gave a series of massive doses, protecting the surrounding parts with sheet lead. No filter was used. A very profound reaction occurred, followed by the characteristic x-ray ulcer on the most prominent part, whereupon the cancerous mass underwent shrinkage, and became almost level, or of normal contour for a thorax from which the breast had been removed. Incidentally the axillary swelling disappeared; this had been treated concurrently with the rest, but had not received more than about half the amount of irradiation. The general health of the patient was greatly improved. Treatments were given at long intervals, because it was evident that it was by no means cured.

About a year later secondary deposits began to appear in the skin, the most pronounced of which were situated over the scapular region of the same side. In spite of treatment these secondary deposits made slow growth, large masses ultimately forming, until finally the health of the patient began to fail, and death took place three years and two months after she first came under observation.

The lesson which the writer draws from this case he states as follows: “This case also makes me ask why the first recurrence responded to treatment so readily and why the secondary growths at a distance from the original one did not do so well. Was it due to the use of the filter, and is it not best to produce an active reaction in cases of this kind?”

He refers to the strong feeling of the profession against the production of x-ray dermatitis as a possible mistake, and suggests that we may not be doing what is best for malignant cases by holding our hand in this way.

The professional prejudice against the dermatitis is certain to compromise the thoroughness of results, because there are often many diseased cells, particularly in vigorous individuals, which withstand the effects of the x-ray. These cells perish when the normal tissues are subjected to an extreme degree, whereas the normal cells again recover. When it is generally understood that at any stage short of necrosis dermatitis can be controlled by the application of radiant light and heat, the professional prejudice to x-ray dermatitis will cease; and with the employment of x-ray with greater energy, better results will be obtained.—[Editor.]

PHOTOTHERAPY AND DERMATOLOGY.

Electrical Methods in the Treatment of Certain Skin Diseases. (By Sinclair Tousey, A.M., M.D., *American Journal of Dermatology.*)

The author first mentions the conditions in which the x-ray is a specific. These include eczema, psoriasis, pruritis, epithelioma, lupus, keloid, dermatitis papillaris capillitii, hypertrichosis, hyperidrosis, tinea, and numerous other conditions. In most of these it is the ideal method of treatment and produces perfect results. While in hypertrichosis the specific action of the x-rays tends not only to destroy the hairs, but also to produce other changes in the skin and the greatest care is required to avoid undesirable effects.

The effect upon any tissue is proportional to the amount of x-ray absorbed by it and for some diseases like eczema, soft rays are used without interposing a screen, while for epithelioma and lupus the author employs a sole-leather screen which absorbs the rays that would otherwise be absorbed by the outermost layers of the skin. These rays would produce a surface irritation or burn without any effect upon the deeper layers of the growth. Part of the x-ray operator's work is to regulate the quality of the x-ray suitable for the case in hand and another part is to determine the proper dosage. This is a matter of a certain strength of radiation for a certain time at a certain distance and it simplifies the problem very much if the strength of radiation can be made uniform for all treatments.

Without some means of measuring dosage the doctor lies between the risk of giving an over-exposure and producing a burn, or giving a lot of ineffective under-exposures. The author speaks of the Sabouraud and Noire barium platinum cyanide pastille as being the surest method to time the exposure. He then proceeds to describe the diseases in which the x-ray is curative. Eczema is treated by x-rays of little penetration (soft rays) without interposing a sole-leather screen. It is possible to bring the x-ray tube quite near the surface, but it is to be remembered that if four minutes exposure at thirteen inches from the anti-cathode equals 1 H. (one Holzknecht unit), the same intensity of radiance at a distance of four inches from the anti-cathode will produce 1 H. in 4.10 minute; the intensity varies inversely as the square of the distance from the anti-cathode. If there is a large area to be treated and the tube is held near the surface, not only must the exposure be a very short one, but the tube should be shifted from one place to another so that one part would not be at a distance of four inches from the anti-cathode or platinum disk while other parts were perhaps two or three inches further away. The x-ray has a specific effect in this disease and is useful at every stage.

Pruritis ani and pruritis vulvæ yield to mild applications of

the x-ray, and in the latter disease gelatine vaginal suppositories of boro-glycerine are useful in removing the cause.

Nothing in medicine is more firmly established than the curative effect of the x-ray in *epithelioma*. A case of the author's which was treated after a number of surgical operations extended right down to the bone, with recurrence in the grafted skin, remains perfectly well seven years after the last x-ray application. Measured doses are advised. In some of the author's cases excellent results have been obtained by producing a mild effect for a long time, while in others the indication has appeared to be to produce an intense reaction at once and then to wait for several weeks. When the severe reaction is to be produced, it is necessary to protect the sound skin right up to the margin of the disease, while the milder longer continued reaction would not injure the skin if an area of 1/3 of an inch all around were exposed.

Keloid is mentioned as being cured by means of x-rays, but there is a great difference between what may be expected in a little keloid of the lobe of the ear where the greatest thickness of tissue to be penetrated was not more than 1/2 inch, and an enormous tumor three inches thick between the shoulder blades. The amount of x-ray which can be applied in such a case is strictly limited by the effect produced upon the skin. In every case thiosinamin, a drug originally suggested by the author for this disease, should be used. Three grains are required every day or every other day for six months. The writer of the paper advises the dose given at bedtime to avoid the giddiness and staggering gait which it is apt to produce.

Dermatitis papillaris capillitii, a disease of the papilla of the hair with the production of nodules resembling acne and keloid, is of an exceedingly chronic character, lasting for years in spite of any ordinary treatment, but yielding promptly to the x-rays.

Although *superfluous hair* may be removed with the greatest ease by the x-rays, the author thinks these cases should be shunned rather than sought, as the patient may make a claim for a real or imaginary burn, besides the destruction of all the hairs cannot be guaranteed.

Ringworm of the scalp and elsewhere is a disease for x-ray treatment *par excellence*. The germs of the disease lie deep in the hair follicles where it is impossible to reach them by solid, liquid or gaseous antiseptics, and where they may live and multiply for years. The x-ray is applied in such a way as to cause the weakened hairs of the entire affected area to fall out, their roots carrying the germs with them (precautions in the way of antiseptic lotions must be used to prevent reinfection of the other hair follicles).

The x-ray application is to be a single application, all at one sitting, or divided into several portions given within a few days, and so having a cumulative effect sufficient to cause fall-

ing out of the hair and some redness and marking of the skin, but no ulceration. Later the hair should return with the original luxuriance and color and texture, and no trace of the disease or any scar remain, and the disease be permanently cured. This can only be accomplished by the application of a measured amount of x-radiance graded to a certain extent by the age of the patient and the consequent variation in sensitiveness of the skin, Sabouraud and Noire's method of dosage is indispensable.

Every precaution must be employed to secure uniformity of effect upon the diseased area. The author claims that *psoriasis* yields to x-ray applications in a wonderful manner. That the patches may be seen to clear up in a few days and certainly show a specific susceptibility to the x-ray. That this is so marked that care must be taken not to give an overdose which may cause intractable ulceration of the psoriatic patch, especially over such a place as the point of the elbow, while not affecting the healthy skin at all. A uniform effect must be secured over the entire patch; and if there is a large one and the tube too near, the central portion is considerably nearer the anti-cathode than the peripheral parts and receives a stronger radiance and may be seen to clear up while the periphery is unaffected. Of course, the applications should be limited to the affected areas and only those exposed which face the x-ray tube and in the case of a very large patch, the tube may be removed from one place to another so that all parts will receive about the same average intensity of radiance; or only small parts may be exposed at once. He thinks that the x-ray has a certain curative effect as well as a temporary local effect, and that so far as the latter is concerned, the x-ray is our best therapeutic measure.

[We are led to suppose that the writer of the above excellent paper places his psoriatic patients upon the proper constitutional remedies, also upon meat free diet. The x-ray applications will clear the skin time after time, but they will not cure the disease until the diet is given the strictest attention.—H. F. P.]

RADIOGRAPHY.

EDITED BY FREDERICK M. LAW, M.D.

The Roentgen Rays in the Diagnosis of Tabetic Osteo-Arthropathies. (By R. D. Carman, M.D., *Journal of the Missouri State Medical Association.*)

After a careful review of the literature on this important subject, Dr. Carman cites eight cases and shows radiographs of the joints which are described in detail. He sums up the radiographic features of Charcot's joint as: 1. Atrophy of

the articular cartilages. 2. Irregular destruction of bone, often associated in the same joint with changes in cartilage. 3. Irregular hyperplasia of bone. 4. Detached bone masses and detritus. 5. Translucent areas.

He says further: There are two reasons for the increased translucency of the bony structures. There is increased porosity and thinning of the compact substance, a dilatation of the Haversian canals due to absorption of their walls, enlargement of the medullary canal, decalcification in the neighborhood of the Haversian canals and simple atrophy or fatty degeneration of the osteoblasts. There is also a diminution of the non-organic elements, especially the phosphates and an increase of the organic material. Finally he concludes: That with rare exceptions, osteo-arthropathies may be diagnosed by radiography alone. That only by the rays can detailed information be obtained as to the extent of involvement in tabetic joints. That the rays will show joint lesions in tabetics where ordinary clinical examination will not.



SOCIETY MEETINGS.

THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

REPORT OF COMMITTEE ON HIGH FREQUENCY CURRENTS.

(Continued from page 464.)

Discussion.

Dr. William B. Snow of New York. I wish to speak particularly with reference to Dr. Law's report concerning dosage. I think from a general point of view the suggestions are timely, especially when a thin dielectric is employed. In my experience, the question of dosage is not such a serious matter as perhaps might be inferred. The average patient will take this treatment with four or five hundred milliamperes for twelve minutes, I think, with safety. I have never seen any harm come from that dosage in treating hypertension, and I think it is unfortunate if we do not feel that there is some place where we can moor ourselves with reference to dosage. To be at sea in the matter of idiosyncrasy is really unfortunate. I think there are dangers. However, I do not think there is danger in treating joints or other conditions where the temperature sensation can be pretty well judged by the heat produced. For instance, in the treatment of a tubercular joint by the direct d'Arsonval I think the patient's sensation of heat will govern the dosage.

I have listened with a great deal of pleasure to the communication by Dr. Humphris. I had previously read that paper, and since the paper was presented I have been carrying out some experiments with the static machine. I believe with the use of the static machine, with a great deal less technical arrangement of the coils, we will be able to do just as good work. I am doing it now, and the patients are delighted; they feel excellent and are toned up by the process. I believe the exercise in this method not only gives the muscles tone and strength, but works out of the system accumulated residue and reduces the fat, which must be consumed by combustion in these long exercise treatments. I employ *the static induced current*, connecting a very large metal electrode which covers the back to one binding post and numerous smaller electrodes to the abdomen, the thighs, anterior and posterior, and to the calves of the legs. These are connected by short wires to a wire that is connected to the other binding post. The speed of the machine is then regulated to give a spark that will discharge about 120 times per minute, and of a spark length that produces marked contractions of all of the muscles attached. Larger or smaller Leyden jars on either side will vary the effects as indicated.

Dr. J. C. Walton. I have been very much interested, and think it is very important that we should regulate the dosage to the capacity of the case. Speaking from my own personal experience, I am satisfied that when I first began to use high frequency currents I used too small a dose. I find a great many cases where I can use 700 or 800 with very much benefit. I think the question of dosage is largely a matter of experience and personal experiment. Watch the effect of your treatment on the case, on tension, metabolism, elimination and other symptoms.

I am very much interested in Dr. Humphris' apparatus, but have never seen it. My way of treating obesity, which has been fairly successful, is a combination of the electric-light bath with autocondensation. I am treating a fat man now who has reduced four inches in his girth. I believe the tissue oscillator gives a peculiar form of exercise that you do not get from other sources, an exercise without fatigue.

Dr. Edward C. Titus. In commenting upon the report of Dr. Law in reference to the thickness of the dielectric, and the different effects produced by a thin or a thick dielectric, I beg to call the attention of the Society to a report presented some years ago, when I believe this subject was thoroughly thrashed out. It was then shown from the results of experiments that subjects of different sizes and weights required different thickness of dielectric in order to obtain a proper balance in the circuit of the high frequency current administered, and that was best obtained by placing the patient upon an air

cushion and increasing or decreasing the dialectric according to the body weight, watching the oscillagraph to indicate when the proper degree of oscillations was evident. I think that remains to-day the only true guide, and the uniform practice that we have grown into of placing all patients on the same dialectric and thinking we are obtaining and administering a pure high frequency current calls for a more thorough understanding of the true technique of such administrations. As I stated before, the air cushion will give us the truest oscillatory or high frequency current as indicated by properly adjusted instruments when the air space or dialectric is increased or diminished according to the size and surface of the patient to which the currents are given. I think if these things can be followed out that there is very little risk at all in administering any of the high frequency currents, especially the one we speak of most frequently, the d'Arsonval current—that all elements of danger and unpleasant reaction will be quite obviated by adhering to the proper technique in their administration.

As to Dr. Humphris' paper, I have listened to the comment of Dr. Snow upon it, and I must state that I cannot quite agree with my master upon that subject, for the conditions that are to be encountered are numerous. In the apparatus which Dr. Humphris has described we have the current adjusted to every part of the body because of the condition of the surface and the rheostats which are in circuit for the control of the applications. With the static induced current we certainly can make a local application to the thighs, chest, etc., but in order to get the same degree of contraction and the same amount of current passing, with only one source of current discharge, I think it would be a rather difficult problem.

Dr. Francis B. Bishop. I think that Dr. Humphris' remarks in regard to having a physician carefully scrutinize these patients while they are under this severe exercise are very timely. We know very well that these obese patients, particularly if advanced somewhat in years, have more or less arteriosclerosis as a rule, some valvular troubles, and some kidney troubles, and by this violent exercise we are very liable indeed to throw upon the system toxins that it cannot possibly take care of. I think patients under this treatment should be handled with very great care in order that we may not get results very often that we do not expect.

The stand as to dosage taken by Dr. Law, I think, is correct, that is, we should give our doses according to our patients. I have had some very unpleasant experiences in the treatment of patients I had never met before, both with continuous and high frequency currents. In a paper a few years ago before this body I brought out a number of these cases.

I was testing the polarity effects of the static machine. I mentioned at that time a number of cases that were benefited by a certain polarity, and those who were badly affected by the same polarity. The effect is so distinct that you can tell it in a few minutes after the patient gets on the platform. In one instance, the case of two sisters with a six-plate static machine, 26 inches in diameter, a small machine, I was using the positive polarity on one sister with benefit. The other sister was treated with the same current, with a very depressing effect, while the negative polarity seemed to affect her beautifully. Since that time I have been giving those questions a great deal of attention. We know we have patients of different temperaments. One will stand one thing, one another. There is nothing that will affect the nervous system so quickly as electricity in any form.

I would like to relate one case that came to me a few years ago. A gentleman was sent to me. I wished to send a continuous current through his abdomen. I placed a large electrode over the dorsal vertebrae and another one over the region of the solar plexus. I passed up to 15 milliamperes. The patient said he was going to faint, and I caught him just in time to keep him from falling. In another case a gentleman fainted away completely. I think that Dr. Law is perfectly right. We have a reflex action from electricity, and we do not know exactly where it is going to stop.

Dr. Humphris. Professor Bragoni is now passing ten amperes of d'Arsonval current through his patients. I have seen him pass eight amperes myself.

Dr. Law, in closing. Answering Dr. Titus in speaking of the dielectric, I think what he said simply bears out my statement that resonance plays a very important part.

(To be continued.)



NEW AND IMPROVED APPARATUS.

THE COLUMBIA 500 C.P. TUNGSTEN FILAMENT THERAPEUTIC LAMP.

The filament consists of 12 loops of wire arranged in a small compass around a glass supporting pillar in the center of the globe, permitting accurate focusing of the rays. Each loop is wired in multiple and the life of the lamp is thereby increased because the breakage of one loop will not affect the others.

The lamp has a regular screw socket and is replaced at small expense and trouble. The tungsten filaments do not blacken the inside of the lamp as do the carbon. Only about one-half as much current is used with this lamp as with the carbon lamp of equal c.p., and it may be connected to the regular lamp socket. The light does not contain so many heat rays as from a carbon lamp and more intense treatment is tolerated.

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Colored screens are provided of red, blue, violet, green or amber to use with the lamp.

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One of the most practical and serviceable appliances recently introduced amongst physicians is a Portable High Frequency Coil, and one of the most effective of such outfits is the McIntosh No. 1 Portable High Frequency Coil, which is shown in the advertising section.

This apparatus affords the practitioner a most convenient means of obtaining high frequency current for treatment purposes without investing in one of the larger coils. It delivers a beautiful high frequency spray suitable for all treatments with the glass vacuum electrodes, the discharge being rich in ultra-violet rays. Fulguration treatment of moles, naevi, etc., may be successfully accomplished with a suitable electrode. A Hand Ozone Generator attached to this coil affords excellent results in ozone treatment, giving the same effect as a large ozonator.

This coil is most economical of current, consuming but one-fourth of an ampere—about half of what others take—but it delivers a higher voltage and frequency than many, the soft, painless character of the current being due to this small consumption.

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By means of the substantial, re-enforced attachment cord with plug provided, the coil can be instantly connected with any lamp socket furnishing 100 to 120 volts direct or alternating current.

It is a most compact coil, being put up in a rich quarter-sawed golden oak case, measuring 9 x 6 x 7½ inches, arranged with clamps to hold handle, cord and one electrode in lid.

Complete directions for operating accompany each outfit.

Full information regarding this very practical apparatus may be obtained by addressing the McIntosh Battery & Optical Co., 322 W. Washington St., Chicago, Ill.

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DRUGLESS METHODS.

IT seems to be a current notion in the minds of irregulars that the practice of medicine is limited to the employment of drugs; and that they have a legal right to employ any other means in the treatment of disease, except drugs or the knife. Under the laws of the State of New York and most other states, this is only true of the osteopath; and their practice is legally limited to their own methods. Some osteopaths believe that a license to practice osteopathy permits them to employ electricity, light and the other physical measures. This is no more their legal privilege than the employment of drugs; and it is the duty of the medical men and attorneys who have charge of enforcing the medical practice act to set them right. There is now in the states of New York and Delaware a fake institution which is issuing diplomas for the practice of natural methods. They style themselves *naturopaths*; and diplomas may be procured from these dishonest self-styled teachers who have assumed the power to give degrees for a price. They assure the unsophisticated that they can practice drugless methods with these diplomas.

There is no department of medicine which calls for more skill and knowledge of physiology, pathology, diagnosis and technique, and none in which there are greater dangers than in the employment of electrical currents, the Roentgen ray, and likewise of other measures which stimulate the nervous system. It is the duty of the medical profession, and

particularly those engaged in the employment of physical measures, to bring before the respective legislatures bills defining what constitutes "the practice of medicine." The ruling of the court of the State of New York is very clear and distinct in this matter; and how these adventurers dare enter upon such methods in the State of New York in defiance of law and prestige, can be explained either on account of ignorance of such laws, or outward defiance, which demands plain dealing.

A recent number of the *Journal of the American Medical Association* contains an array of facts concerning a chartered organization which assumes to carry on its disreputable business in defiance of the laws of the State of New York.

How such an organization could have obtained a charter in this State is a subject for investigation; and it is the duty of the County Society of the City of New York to investigate this self-styled college in our midst.

THE RELATION OF THE MEDICAL PROFESSION TO THE PUBLIC.

THE painful effort made by an eminent physician recently in calling attention to the unrest of the public in their attitude and sympathies for the medical profession is disposed to do little toward restoring public confidence. For while it is true that the medical profession has accomplished remarkable results in prophylactic medicine and hygiene, which should inspire public confidence, there are other things which this authority failed to recognize, and for which no remedy was offered, that are contributing most to the creation of public unrest, which is properly the fault of the medical profession.

As the medical profession has become more enlightened the old tenets of the forefathers concerning the employment and efficiency of drugs in therapeutics have changed; and eminent authorities have been quoted and repeatedly placed on record in the lay press as decrying the value of drug therapy, without supplying better means.

The surgeons have carried their art into the treatment of nearly every condition—properly speaking, medical and surgi-

cal—to such an extent, and very often with such bad results, that the public have become to a degree terrified and prejudiced against the surgeon; and a well-marked reaction is evident.

When a medical man refers a case to a surgeon, it is now frequently stated by laymen that there will be a division of the fee. The medical profession itself has taken active measures to combat this deplorable fact, thereby recognizing that such a commercial injustice has existed sometimes between physicians and surgeons. That such practices take place among the better class of physicians and surgeons must be emphatically denied; but that in the medical profession there are some men whose impulses are purely commercial and heartless demands the investigation and condemnation officially within the ranks of the profession.

A comparison of results between the medical practitioners who employ only drugs, surgery, and suggestion in the treatment of disease, with the results obtained by the cults and healers who treat their patients by suggestion and manipulation, has often shown about the same results, at least apparently so to the layman. This is because the relation of conditions and results—the *post hoc propter hoc*—when favorable conditions follow, the irregular obtains as much credit and even more than the medical practitioner. Placed in this position, the profession no longer holds the sole confidence of the community in this particular. The tendency of the profession to adopt suggestion, as the neurologists have, sometimes in connection with the advocates of the Emanuel movement, leads the public to expect practically as good results from one as from the other, and to pay their fees to the healers instead of the physician. With the neurologist, the tendency is too often to attribute diseases such as hysteria and neurasthenia to psychopathic causes, without reference to physical conditions that are neglected. The patients as a rule are not cured, which still further weakens the attitude of the profession, and strengthens the claims of the psycho-therapeutic cult. There is a degradation by comparison of results between the profession and sentimental healers, with laymen for judges.

A factor which has a tendency to degrade medical practice is medical competition. The profession is now overcrowded,

and in the struggle for a livelihood physicians are suspected of preying upon the credulity of the public.

Another condition which belittles the medical profession is the present clinic practice in connection with medical colleges, hospitals, and dispensaries, which often vie with each other to increase their attendance of patients, taking patients without regard to their ability to pay for their treatment. The treatment in these clinics is apt to be indifferent, when young physicians are expected to treat patients who from appearances are prosperous. Poor patients are apt to suffer because the undeserving ones, who are able to pay, crowd themselves into these places for treatment; and it is human nature for some of the young physicians under such conditions to become indifferent to them all—much to their own disadvantage, the disadvantage of the public, and the discredit of the profession.

In the large cities these conditions are deplorable; and the study of methods which will bring right and justice to all will require a complete reorganization of the conditions of society as to the relations existing between the public and the profession.

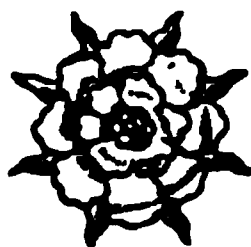
As previously stated in an editorial in the JOURNAL, the only way to right dispensary abuses is to place young men in charge of these dispensaries who are paid well for their services, and to prevent free medical services to all except the dependent poor. This is within the power of the medical profession. The laws already existing on the statute books are a defense against the taking of advantage in free clinics by those who are able to pay for medical services. The penalties are severe for the violation of these laws and can be easily enforced if the profession is vigilant.

In addition, it behooves the profession to awaken to the employment of every measure which contributes to the relief of human suffering and, throwing off the shackles of conservatism, permit scientific progress in every direction.

ALCOHOLIC INJECTIONS IN THE TREATMENT OF NEURITIS.

A PRACTICE has become quite popular with neurologists and surgeons of treating neuritis by injection of alcohol in the vicinity of the nerve involved. This practice has been in vogue long enough now to show that the relief afforded is but temporary and that cases of neuritis so treated almost invariably relapse and are sometimes made worse. If the correct view of the actual condition of neuritis and its treatment by measures which dissipate the local inflammation and consequent infiltration were generally adopted, very few of these cases would go beyond the first stage; for sciatica, brachial neuritis, tic douloureux, herpes zoster, and neuritis located at other points are very promptly cured, generally within a week, when treated at the outset, by proper electrical methods. That the members of the profession who are treating these conditions are not conversant with effective methods of relieving this trouble is evident from the fact that alcoholic injections are ever resorted to.

There are few cases of neuritis that come under observation even some time after the outset that cannot be cured by methods which will not relapse, to ever lead to the employment of the method by alcoholic injections. It is the mechanical currents, particularly the static currents, which invariably cure these cases in the first days, that are indicated.



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WILLIAM D. MCFEE,
President of the American Electro-Therapeutic Association.

BENEFITS FROM THE EMPLOYMENT OF ELECTRICITY IN GASTRO-THERAPEUTICS; CONFIRMED RESULTS AND DEDUCTIONS FROM OVER A THOUSAND CASES.*

BY ANTHONY BASSLER, M.D., NEW YORK, N. Y.,

Visiting Gastroenterologist to the People's Hospital and German Poliklinik, New York City; author of textbook "Diseases of the Stomach and Upper Alimentary Tract," Editor of *American Journal of Gastroenterology*, Etc., Etc

IN a busy clinic and private practice devoted to gastroenterology in which mostly diagnostic work is being conducted, the results of therapeutics are not as closely observed from a scientific standpoint as is desirable. With even the corps of trained associates as work with me, a moderate number of patients means a huge amount of work, and when these men are applying themselves to the diagnostic sides of the mysteries of disorders of the hollow viscera of the abdomen and the organs allied to digestion, a day of work closes in which the therapeutic sides have had but scant attention. And yet, as the ultimate object of all of our endeavors as physicians is the cure and prophylaxis of disease, or the alleviation of distressing symptoms, some applications of treatment were always called for and carried out. My conception of the proper course to pursue in therapeutic medicine is first to lay a groundwork of accurate diagnosis in all cases in which this is at all possible. In gastroenterology, commonly, this is a difficult matter, requiring close individual study and observation, and the lapse of a length of time beyond the satisfaction of the average patient, and very often the physicians too. Still, as rational practitioners of medicine, how can we safely conclude on the value of any therapeutic measure employed unless we have this desirable scientific basis to guide us? The complex machinery of the human body, energized and regulated as it is by the sympathetic system and the correlations of all that physiological chemistry includes, should make every monotherapeutic en-

*Read before the Twenty-first Annual Meeting of the American Electro-Therapeutic Association, September 5th, 1911, at the College of Physicians, Philadelphia, Pa.

thusiast decidedly more conservative in definite statements than is now common. Still, on the whole, we to-day are building for the future much better than our forefathers did for us in the past. Here and there, we are now laying facts instead of theories, immutable stones of strength instead of only words and thoughts soon to be forgotten. Then let us, on the subject I present to you, stand only upon the stones, few as these are on the use of electricity in the treatment of stomach disorders.

For these observations, only the uncomplicated, primary, and simple forms of stomach disorders were studied, and the results were rather closely watched. They were cases of sensory, secretory, or motor disturbances, either singly or in combination with one another. These were checked up in the sensory cases by the history of the patients, in the secretory by the history and test-meal analyses, and in the motor by the history, test-meal analyses, and physical examinations of the stomach. Unfortunately for the purpose of this paper, more measures than electricity alone were employed in the treatment of some of the cases, but whenever possible this agency was used alone and the difference noted between those and the other groups of cases treated without electricity. Not a few were handled by dietetic and medicinal measures first, and, when improvement was not observed, electricity was added, and these were then studied to note any change. The modalities used were faradism or galvanism or the combined currents from cells, intragastrically administered, the faradism in slow interruptions, either pole internal, and the galvanism up to 25 milliamperes, either continuous or in slow or fast interruptions and with the positive or negative pole internal. The combined currents were a continuous galvanism, a selected pole internal, and a slow interruption of the faradic.

At the onset I wish to say that any one who states that the benefits possible of being proven by analyses in the use of electricity in stomach disorders are *nil* must be harkened to respectfully. But to him must be made the answer that if he selects his case properly and uses it only in those without a local pathology this is not so, although definite results that can be proven by analyses are not common. In this therapy, without a question, we have a means of value, but,

like everything else, one that must be used sensibly and in a proper case. Now, what can be done with it?

In the hyperesthesia cases, all the way from those that have only distress when solids or fluids are taken into the stomach, to the true gastralgias, continuous galvanism with the positive pole internal is useful. When these pains radiate from the epigastric region to the hepatic, general abdomen, and back, the broken up continuous current with a large electrode external and shifted about was well worth a trial. In cases of tender adhesions about the gall-bladder, duodenum, stomach, or elsewhere in the abdomen, there is no better plan to relieve the added congestions than by this means, although, of course, operation is the better advice in the majority of cases. In the obscure enteralgias and tendernesses along the colon (such as are seen in cases of chronic colitis) galvanism is worthy of a trial, and when the spine is sensitive (as is seen in the neurotic cases) galvanism mostly to the back is well worth a continued effort. A general galvanism has been highly recommended for neurasthenias, but in our experience the high frequency and static currents answer best, and we usually refer these cases to certain gentlemen who are expert in the employment of them. The clinical fact was, however, if the causes of the neurasthenia could be uncovered and were treated, that improvement was marked in the course of time without the electricity, although its use was often a welcome addition.

In the secretory cases, if no motor disturbances were also present when the combined currents were used, the galvanic current was employed. With the negative pole internal, a considerable number of the hyperacidities and hypersecretions were benefited in the way that more or less destruction of the protoplasm in the proliferated oxyntic cells took place, allowing of a permanent diminution of the regular running status of secretion. Care must be taken with this form of treatment, because an internal electrode resting steadily upon the mucous membrane, and from which a greater than 25-milliampere of current is coming off, may cause a liquefaction of the tissues at that point, with the danger of the subsequent development of an ulcer at the site. The safe to use positive pole internal had no effect upon lowering the status of supersecretion, but was efficient in some cases

in diminishing the hyperesthesias of the mucosa, such as is seen in the uncomplicated cases of hyperesthesia and neurasthenia gastrica.

The best results of treatment were observed in the myasthenic to the atonic cases, when they were not secondary to pyloric stenosis. It was the usual observation when a gastric atony was not advanced to the point that on lavage or test-meal extraction considerable amount of residual fluid remained in the stomach, that two or three weeks of faradism caused this to disappear. More than that, these dilated, weakened walled, and flabby stomachs soon took on a better tone, gripped the foods firmer in the process of gastric digestion, and the patients made substantial general as well as local improvement. In them, the slow interruptions were used with either pole internal. Some atony cases, when a chronic gastritis was not also existing, having a subacid stomach would secrete more to normal when this tone came up, but no anacid cases ever had any degree of secretory hydrochloric acid come back. In the gastroplosia cases the faradic currents were of no value to correct such degrees of atony or dilatation as were present, but had some benefits on the weakened walls of the abdomen these cases usually have; nothing, however, that could be noted was observed in benefiting the complex causes of the prolapse itself.

What I have stated to you are facts in the observation of many cases, and is about as far as I can conscientiously go. But there is a realm in which I would like to theorize for a few moments, one filled with much interest to me. Most all of this work was carried out in my clinics, in which the bulk of the patients were outrightly Jewish in type. These people, although blessed in many ways, are deficient in certain emotional controls which characterizes the makeup of the offspring of the Aryan races. They are emotional and self-centred to a high degree about their illnesses, have a strange racial proneness to sensory neurosis (although rarely distinctly hysterical), and are very liable to metabolic disorders of different kinds. These, with their great appreciation of any kindness shown them and their willingness to help you in the treatments of their disorders, make them a study in themselves. Now, when electricity, which possesses great mystery and fascination to them, is employed in treatment,

they often tell you of its beneficial results nothing short of ludicrous to a keen observer. Some of my associates have called this "moral effect," and at times this seemed true to me. But there were others in which this could not be so—those, for instance, who rebelled against its employment or who argued fixedly in advance that it would do them no good. A number of these cases having no demonstrable illness improved immensely. Why was it? I do not know any more than I know what electricity really is. But I have explained it to myself and others about as follows:

As I hinted before, the knowledge of the medical profession stands outside of the functions of the sympathetic system in almost total ignorance, and in the abdomen the energies of these centres and nerves are paramount. To all that they exist for are added the still greater mysteries of the correlation of functions between the different organs of the body and those in the abdomen notably. These great unknown seas of uncovered important facts are further shadowed by the biochemical processes in the protoplasm of only a single cell in any organ. May it not be—and I certainly feel from my experiences that it must be so—that in electricity we have a therapeutic agent affecting the cell activities far in advance of what our limited knowledge of physiology today can explain the results of? Some day, no doubt, suitable explanations on this will come, but until that happy time arrives in the science of medicine, let us go on, undaunted but as intelligently as we can, and feel grateful for this power which God has given us to use for His sick, and patiently await the time when man can tell us the reason why it did or does happen.

126 E. Sixtieth Street.

Discussion.

Dr. G. B. Massey, of Philadelphia: I wish to voice my appreciation of Dr. Bassler's paper, and I know that all will join me in it. It is not a paper that will lead to much discussion; possibly to more thought. I merely want to say what I think I have said in print somewhere: I believe that a powerful constant current carried through the abdomen of a patient lying on a large pad, the active pad being the size of the spread hand, with a current of 40 to 100 milliam-

peres, will stimulate structures within the abdomen in a way we do not understand, though my suggestion was possibly that the sympathetic nervous system might be stimulated. I think those of you who attend our neurological societies agree with me that the characteristic of neurologists of today is to pay attention altogether to the cerebrospinal system, to the exclusion of the sympathetic, thus missing an important field of action in our neurasthenic patients. There might also be some action of these powerful currents on the parenchyma of the organs.

Dr. W. B. Snow: I should like to ask how long these applications were made intra-gastrically and what strength of current was used.

Dr. Bassler: Ten minutes, with never more than 35 milliamperes of galvanic current, and just a comfortable tolerance with the faradic current.

Dr. Snow: Did you make a practice of having anything taken into the stomach before the treatment?

Dr. Bassler: I gave them a glass of water so as to conduct the current.

Dr. Snow: I ask the question because it is a very important matter, for it might explain in part at least the action of the current. I believe that increased hyperemia would to a great extent explain the tonic action upon the cells. Hyperemia means more nutrition, increase of circulation and metabolism.

There are many other uses of electricity for treatment of the stomach. In gastric colic the static wave current will contract the stomach and completely expel the gas. It will relax spasm of the pylorus. The direct D'Arsonval has a wonderful effect in increasing the nutrition and functions of the alimentary canal. Prolonged applications of radiant light I believe also are one of our most valuable measures in the treatment of alimentary derangements.

Dr. A. B. Hirsh, of Philadelphia: I wish to say that the stomach was distinctly contracted on the occasion of some of the experiments referred to this morning, by vibration of the first, second and third lumbar intervertebral spaces. Possibly, from the electrical point of view, this may be efficacious in some of these gastro-therapeutic efforts. Contraction of the stomach was recognized by superficial and deep

percussion made by others than the operator, and this percussion dulness outline verified by the remaining physicians who were present.

Dr. Pfahler: Was the stomach distended with gas.

Dr. Hirsh: It was some hours after any food was taken.

Dr. Pfahler: Without any preparation?

Dr. Hirsh: Without any preparation.

Dr. Bassler, in closing: There is nothing more to add excepting that I am a believer in the use of static currents in the neurotic abdominal disturbances, most of which are complex in type, usually sensory and secretory, sometimes sensory, secretory and motor altogether, sometimes only motor and sensory, etc. I think that the static currents, particularly the Morton wave current, are of decided value because in these cases the element of neurasthenia is a great factor, and that it is undoubtedly assisted most materially in a beneficial way by the use of the static currents.

I had no experience with relaxation and bringing about contractions by electrical means excepting that several years ago, with an electrode in the stomach, bismuth emulsion around it, and the use of the faradic currents, we made a number of observations radiographically and fluoroscopically, and with all degrees of current up to the patient's tolerance it seemed to make no difference. We could not contract the stomach in any noticeable way by a faradic or galvanic current or combined currents delivered intra-gastrically.

We tried very hard to prove that these beneficial changes were brought about by a process of massage and a stimulation of the peristaltic waves, and that in that way the stomach shrunk up, but by the x-ray we were never able to see a contraction wave in the lesser or greater curvature of the stomach or the body of the stomach as a whole while the currents were passing through. Still these clinical results were brought about after a time, and it seems to me as if there must be some change in the neurons or the protoplasm of the cells in the structure of the stomach, rather than a direct stimulating effect upon the muscularis.

A RATIONAL MUFFLER FOR THE STATIC OR HIGH FREQUENCY SPARK.*

BY GEORGE E. PFAHLER, M.D., PHILADELPHIA, PA.,

Director of the Electro-Therapeutic Laboratory of the Medico-Chirurgical Hospital.

THE noises caused by the static or high frequency sparks are a decided objection in an office. They frighten timid patients, make nervous patients more nervous, interfere with

FIG. 1.—DR. PFAHLER'S MUFFLER DISMANTLED.

conversation, and obscure the other sounds of apparatus which the operator should hear to properly adjust and run his machines. They are also objectionable to neighbors and other people that may be in the same house.

These objections have all been recognized, and a number of mufflers have been designed which are more or less useful.

The requirements of a good muffler, as I see it, are as follows:

1. It should efficiently muffle a spark of one-eighth to ten inches in length.

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2. It should be easily set into place, or should be so arranged that it can remain constantly in position and yet permit all kinds of work.

3. It should be easily cleaned, for sparking balls do not work well when dirty.

4. It should not permit leakage along the sides.

5. It should be neither unsightly nor in the way.

6. Breakable parts should be easily, quickly, and cheaply replaced.

FIG. 2.—MUFFLER SUSPENDED ON THE DISCHARGING-RODS.

The above requirements have all been answered by the muffler which I have designed, and so far as my knowledge goes they have not been answered by any other muffler.

The construction is very simple. The materials will cost approximately twelve dollars.

It consists primarily of two glass plates 14" x 17" (two cleaned 14" x 17" negatives). These are the breakable parts and can be always easily, quickly, and cheaply replaced. These two pieces of glass form the top and bottom of the box which forms the muffler.

The sides of the box are five inches deep and exactly fit

the outside of the glass plates. The glass plates rest upon $\frac{1}{4}$ -inch strips on the inside of the box.

The sides of the box are made of hard rubber $\frac{1}{4}$ -inch thick, and are fastened together by small brass screws.

At one-third of the distance from the front a hole is cut in the ends to permit the passage of the sparking rods.

The back part of the box being the heavier, rests by means of a cross-piece upon the hard rubber of the projecting poles

FIG. 3.—MUFFLER PROVIDED WITH OTHER DISCHARGING-RODS IN ANOTHER POSITION.

of the static machine. (I have used it on the Baker static machine, but it can be used on any one.)

The weight of the anterior part of the box is borne by the sparking rods which pass through.

The box was at first made of wood, which lasted for months, but when damp weather came on the current leaked to the ends of the box and burned the wood. At this juncture the wood was replaced by rubber, but when using a ten-inch spark inducing a high tube for Roentgen treatment, there was still leakage.

We then passed the rods through silicate tubing five inches

in length, which were placed in the ends of the box, and efficiently cut off all leakage of current from a ten-inch spark.

The box is large enough to permit a dish of drying material to be placed in the posterior position.

The top glass plate rests in place by its own weight. It is raised for the purpose of cleaning, etc., by simply turning a small arm which projects on the inside and pushes up the lid. This can be seen in the illustration located at the front of the box.

The muffler is not really needed in Roentgen work; therefore, I have recently attached it to the front of the machine. Here it is always ready and only needs to be connected when desired by wires from the regular rods to an extra pair of rods in the box.

This muffler has been put on the machine and is left there during all kinds of static, high frequency, and x-ray treatments. It answers all of the above requirements and has been entirely satisfactory.

1321 Spruce Street.

Discussion.

Dr. W. B. Snow: I am pleased to see this muffler. I would only suggest things that I think will increase its efficiency. If it were made two inches thicker, so that the distance between the brass balls and the glass sides was greater, a longer spark-gap could be used. Otherwise if the glass becomes damp the spark will jump to the glass and follow the glass across and back to the other ball if a long spark-gap is required.

Dr. Pfahler: So far it has not done that.

Dr. Snow: If the machine is run for a day, it will be liable to accumulate moisture, when this will occur.

Dr. Pfahler: I have run it as much as six hours in one day without its doing it.

Dr. Snow: Another thing I want to suggest is that glass is hygroscopic. I have a muffler at home, and without its being shellacked it is of no use. The static current will follow the glass. For that reason, a coating of shellac on the inner and outer surfaces of the glass are necessary.

Dr. G. B. Massey: I want to call attention to the very inexpensive yet efficient muffler I have been using for several years at the suggestion of Dr. Lucy Hall Brown, of Brooklyn. It is simply a large lamp chimney of the kind that you can get at cheap lamp stores, about twelve inches long and five or six inches in circumference, and of the ordinary shape, small at the top and larger at the bottom. If you get

your lamp chimney and cut two corks to fit it, and then burn holes through the middle of your corks to admit your rods, you have the whole thing complete. The play of the sparks is in the broadest part, so that you have about two and a half inches between the edge of the balls and the edge of the glass. But that matters very little, because every morning it can be taken off the machine and put in hot water, which will dissolve out the nitrites that form in it. If the water is hot it can be dried very quickly. I find it very convenient to have removable balls, because the balls themselves will require frequent washing when kept in a muffler.

Dr. Edward C. Titus: I am very glad to see this muffler. I think I had the privilege of showing him one that I have in my office some time ago when he visited me. It consists of a glass cylinder, nine by sixteen inches, of good heavy glass about $\frac{1}{8}$ -inch in thickness. I find it necessary to give it several coatings of good shellac, which, when thoroughly hardened, acts as a better non-conductor than the plain glass itself. I also have at the ends of these cylinders wooden caps fitted on with three holes in each end. These I close with ordinary corks. I find it necessary at times to give the muffler some ventilation, otherwise you get so much condensation that it interferes with the efficiency. A glass muffler will cut down the efficiency from 35 to 40 per cent. If we allow some air to get through the muffler, it muffles to a great extent the noise; but if we have the muffler closed, it will cut down the efficiency from 35 to 40 per cent. To obviate that the vents have been very successful. The terminal balls in the muffler seem to corrode and interfere with the discharge of the spark very greatly when confined in a closed muffler. I have tried several kinds of metal, and am now using a kind of hardened copper which so far has given very satisfactory results.

Dr. Henry E. Waite: When I first commenced to make mufflers they were made of small glass tubes. They were deficient. We made one about a year ago that went up to Quebec that was eighteen inches square and four feet long. There was a glass door in front through which you could put in lime to take up the nitric acid fumes. This muffler has given perfect satisfaction.

Dr. William Benham Snow: I would like to say a few words in regard to the size of the balls in the muffler. Those terminal balls regulate the discharge, and that must be thought of in making a muffler. Be sure that the size of the balls is such as to regulate the dosage, large, medium, or small. Those which Dr. Pfahler shows there are rather smaller than most of them used in static work.

Dr. Herbert F. Pitcher, of Haverhill, Mass.: I want to mention a muffler that I use. Several years ago I bought an ozone

inhaler for five dollars, and was stuck very badly, because as an ozone inhaler it wasn't any good at all. It lay upon the shelf for several years. The nurse in dusting the things one day asked me if she could not put it in the waste barrel. I looked at the thing and thought why not make a muffler of it? I simply removed the ozone inhaler, and that left the two holes on the sides. Then I had some larger balls made for the discharging rods. When I want to use it for high frequency or the wave current I just cork up the holes. I did not mention this because I thought it an improvement upon Dr. Pfahler's excellent device, but thought if any one had a contraption of this kind he could put it to some use.

Dr. A. B. Hirsh: I want to offer a suggestion along the line of making mufflers: that is a glass tube of sufficient calibre. To obtain a glass tube sufficiently large for the purpose, it is best to take one of these large water bottles, now used so generally by spring-water concerns in cities, to your glasscutter and have him cut off the top and bottom of that bottle, using a bottle probably two feet long and one foot in diameter. A wooden diaphragm in each end will serve to close the ends, and holes through these will permit space for the rods.

Dr. Snow: That should be well shellacked inside and out.

Dr. Hirsh: The suggestion just received from Dr. Snow makes me add that we should pour shellac into the bottle and rotate it until the interior is well coated, afterward shellacking the outside.

Dr. Pfahler: In closing I would just like to call the attention of the gentlemen to the fact that these various glass cylinders are not as easily cleaned as this. They are probably not quite so sightly. So that a number of the requirements that I enumerated in the paper are not met by the mufflers they have suggested.

Dr. Walton: How much does this cut your current down?

Dr. Pfahler: So far as I know, none at all; but I am not able to answer that positively. None that I have observed.



MODERN METHODS IN THE TREATMENT OF
TUBERCULOSIS.*

ARTHUR W. YALE, M.D., PHILADELPHIA.

Common sense, it is said, is so called because it is an uncommon attainment. In all callings of life it is desirable, but in the practice of medicine it is absolutely indispensable. The old-time irrational methods of treating disease have passed into the ancient history of therapeutics. We no longer relieve the plethoric patient of a quart or so of blood. We do not regard purging as the infallible remedy for every ailment, while cupping and blistering have been obsolete for years.

We now seek to meet diseased conditions in a rational manner, and enlist every adjuvant of proven value to our aid. There is a familiar old adage, "exceptions prove the rule," and the rule that diseases are now treated in a rational manner has, in the opinion of the writer, a conspicuous exception in the modern treatment of tuberculosis.

We are everywhere confronted by the grave menace of the great white plague. Through the last decade it has made its insidious advance, aided by the unsanitary condition of the crowded districts, the ill-ventilated street cars, and from other sources, until it well behooves us to ask, "what are we going to do?" or rather, "what *are* we doing?"

What are we doing? We are taking our tubercular cases, with their inflamed lungs, in their weakened condition and lowered vitality, and turning them out of doors, sheltered only by flimsy shacks, exposed to all the vicissitudes of a changeable climate. We are feeding them, superfeeding them, pouring down raw eggs and milk *ad nauseam*, and then, in the parlance of the day, it is "up to them" to get well. Truly this method of fighting a powerful enemy is pitiful in its weakness.

We stigmatize as barbarous the custom of the Chinese, who turn their aged and infirm out to die, but they may well turn on us and point to our consumptives, housed in frail

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sheds, turned out—well, let us be optimistic and say, “to get well!”

It has been a time-honored custom to send the tubercular patient away from home, but statistics have shown that of these a large number who are sent home “cured” die within two years. Is not this a terse comment on the “exile” method of treating tuberculosis?

It is by no means the intention of the writer to utter wholesale disparagement of sanatoria. On the contrary, it is his firm conviction that much can be accomplished in an institution which is impossible under home surroundings. The patient is under a strict regime, his diet is carefully supervised, hygienic conditions prevail and in every respect he can receive better care than at home. While patent medicine advertisers may urge that the “best place for a consumptive is his own fireside,” the physician is well aware that frequently “his own fireside” is the very worst place for him. He may either be the victim of neglect or of mistaken kindness, and it is by no means easy to secure the golden mean of skilled care and hygienic surroundings so essential to recovery. This environment is obtained in an institution, and the writer would repeat that his purpose is by no means to condemn tubercular sanatoria, properly equipped and conducted. But he *does* most emphatically protest, not against the institutions, but against the so-called expectant method employed—according to which absolutely nothing is done to conquer the disease or even hold it in abeyance. The sole hope is that by means of fresh air and superfeeding the patient’s lowered vitality will be built up, so that when it is built up sufficiently it will conquer the disease. Yet, as the disease has been progressing, in all probability with more rapidity than the patient’s vitality, this method should fail to appeal not alone to science, but to ordinary common sense!

How can tuberculosis be treated rationally? Physiotherapy has attained brilliant results in other fields, but the profession has clung so tenaciously to fresh air and superfeeding as the sole hopes of the consumptive that these modalities have not had ample opportunity to demonstrate their power in combating the diseased condition. Enough has been accomplished to prove that they can, do and will secure results which are impossible by the expectant method.

Let us consider first the diagnosis of tuberculosis, which is not always easy, especially when small areas are involved. As is well understood, every known or suspected case should be radiographed, and it is essential that this radiographing should be done by one skilled in this work, and equipped with apparatus capable of producing a radiograph with an exposure of not over ten seconds. Let the writer especially emphasize the importance of sending these cases to one who is making radiography his specialty, for it is as absurd to endeavor to make a radiograph of a chest for the diagnosis of phthisis pulmonalis with a coil of the suit-case type, as to practice optometry with an ophthalmoscope.

The practitioner, however, who is equipped with a small coil or static machine may locate the grosser lesions with the aid of a fluoroscope. For this the patient's chest should be bared and gone over anteriorly, posteriorly and diagonally with the fluoroscope, and it has been found helpful to do this in a darkened room, rotating the chest from side to side, when affected areas are discovered, to determine their thickness. The operator will, in a short time, become proficient, and by comparing the sides, not only the location of the lesions, but their exact size may be ascertained. To illustrate the diagnosis of tuberculosis in its incipency, it may be of interest to cite a case:

Miss L., aged 19, a dressmaker, had had a cough for four months which had baffled all efforts of the family physician. As a result she was steadily losing weight. Superficial auscultation and percussion revealed nothing, and at the next visit, which was made to the office, the patient's chest was bared and a fluoroscopic examination made. This disclosed a consolidation of the apex of the left upper lobe, the area extending entirely through, and the density of the shadow being the same, viewed anteriorly, posteriorly or diagonally. The diagnosis of this small area of consolidation was corroborated by careful auscultation and percussion on the bare chest walls.

At the end of six weeks, with two treatments of thirty minutes each per week, the patient gained in weight and lost her anemic appearance. The cough and all other symptoms disappeared, and it may be of interest to note that while under treatment she continued her work without cessation.

This is merely illustrative of the numberless cases which may be arrested in their incipency, and which are too often overlooked by the busy general practitioner. Small lesions incapable of being diagnosed by the most careful observation of physical signs can be readily detected in a good radiograph, or somewhat larger lesions will be revealed by the fluoroscope. If, therefore, the physician will but use one of these invaluable adjuvants for the early diagnosis of this malady, or send suspicious cases to those with suitable apparatus, the disease may be readily conquered in its incipency.

With regard to treatment by the x-ray, Dr. Gibson, of Denver, says: "I have come to the conclusion from clinical experience that I am causing with x-rays in advanced and suitable cases a destruction of the tubercle bacilli, bacteriolysis, which, being absorbed into the blood, the toxin which, being an endo-toxin, is very likely set loose into the blood and lymph stream, arousing a reaction, and the production of antibodies or amboceptors of Ehrlich; or possibly, in their own mysterious way, increasing the opsonic index of the individual, even to the point of changing the negative chemiotaxis for an absolute positive chemiotaxis, so that the phagocytosis may be increased sufficiently to take care of all the emergencies that may arise."

In other words, you produce in suitable cases, by means of x-rays, an auto-specific or tubercular toxemia, arousing a reaction in the host of liberated toxins that may be of great benefit to the patient. Dr. Gibson finds that old cases, where germs are present in sufficient quantities to cause by their destruction sufficient toxin, are best adapted to the x-ray.

Crane's theory, summed up in these words, is: "The immunizing substance set free under the influence of the x-ray is of necessity autogenous, that is, it is formed from the actual microbic strain which is producing the disease." Wright insists on the importance in all opsonic work of using a vaccine made of the bacteria of the patient himself, rather than a stock culture. In this way many of the difficulties and mistakes incident to bacteriological diagnosis may be eliminated.

Dr. DeKraft, of New York, the eminent authority on this subject, states: "It is possible that such a ray produces tissue contraction in the affected tissues, and of the efferent lymphatics, and an aggregation of the poisons at the periphery

of the tubercular focus, thus preventing systemic absorption and assisting in repair. It is possible that as a result of the above action there ensues a drying of the surface of the mucous membrane, an absorption of inflammatory products and an otherwise unfavorable soil for the propagation of the bacilli.

"The sputum of patients so treated is characteristic. We get very quickly lung tissue and a few blood cells, rusty sputum similar to that found in pneumonia. Pus is often found. Later the sputum clears, leaving only a few bacilli in the sputum. . . . If the sputum has been offensive and mucopurulent at first, it becomes, as the patient progresses, lighter in weight and easier to cough up. The tubercle bacilli quickly being to increase in number; they soon form clumps and get misshapen, short and stumpy, and take the stain more readily. Later they begin to decrease in number, and may cease entirely."

The writer simply desires to emphasize the truth of the foregoing quotations, in that his results corroborate the statements of these eminent authorities. The x-ray, to be effective, must be given for a long time and frequently repeated. The writer has found that the use of a high tube, employing a small amount of current over long periods of time, one-half to one hour thrice weekly, or in extreme cases daily, will, in suitable cases, produce brilliant results. For under its use not only incipient and first-stage cases can be arrested and cured, but the same may be true of second-stage cases, while even in the third the patient's condition may be markedly improved and the progress of the disease checked.

But as our *materia medica* equips us with numerous drugs of varying actions to meet as many different needs, so does physiotherapy furnish us with as many modalities to meet the various pathological conditions of this disease which affects the organism so widely. The high frequency current will be found markedly useful, especially in anemic cases, to increase the number and activity of the red blood cells and also of the leucocytes. The writer would at this point call attention to the fact that a high frequency current of therapeutic value in the treatment of phthisis pulmonalis cannot be produced with the small or suit-case coil, but is best generated by the static machine with suitable resonator, as the

initial voltage is probably ten times higher than that generated in a coil, and thus deep penetration can be secured.

Another measure which is of use is the employment of the vibrator over the cervical and dorsal vertebra and dorsal interstices, following the line of attachment of the diaphragm. By this mechanical stimulant not only the circulation of any given organ can be increased, but what is more important in the treatment of phthisis pulmonalis, the lymphatic glands can be stimulated to increased activities, and thus the elimination of ptomaines is facilitated.

Patients are often sent miles away from home, to a climate whose air is pure and health-giving, yet we have ozone (O_3) with its loose molecule of oxygen waiting to superoxidize the blood by proper inhalations, for the inhalation of ozonated volatile oils will aid in superoxygenating the red blood corpuscles, and favor the elimination of ptomaines by their complete oxidation. Furthermore, the ozonated volatile oils, coating over the unaffected areas, allow the bacilli-laden sputum to pass over the delicately lined bronchial tubes more easily, and prevent them from invading fresh areas. The oils are soothing to the membrane, allaying coughing, and it has been proved that oils with turpen bases absorb fifty times their atomic weight of ozone. By lining the bronchial tubes with ozonated oils, through inhalation, the ozone is slowly given off and absorbed.

In many cases the blood tension is too high, due doubtless to the repeated contraction of the larger blood vessels from the spasmodic effort of coughing. In others, especially those cases with repeated hemorrhages, the tension is too low. Here physiotherapy intervenes, and by auto-condensation regulates the blood pressure, which can be accomplished by no other means. The physician treating the case should exercise great care in making diagnosis and in the treatment of the abnormal blood tension.

The static wave, the static brush-discharge from wooden electrodes, the high-frequency effleuve, particularly from the DeKraft resonator, will be found very useful in increasing the elimination of the toxines, and will relieve the blood current of the absorbed ptomaines by their complete oxidation. Furthermore, hyperemia without stasis can be produced over the affected areas.

In intestinal dyscrasia in these cases, the actino-therapeutic or other high candle power lamp will be found very beneficial, since phototherapy markedly increases the number and activity of the leucocytes; but this must not be used over the areas rayed, as it counteracts the effects of the x-ray.

If the intestinal tract has become invaded by bacteria, the writer has found the administration of fermillac, or similar product containing the lactic acid ferment advisable. In acute exacerbations, it is well to keep the patient on this diet exclusively from twenty-four to forty-eight hours, urging him to take as much as possible, since these ferments have the property of destroying the other bacilli in the intestinal tract. If fermillac is not obtainable, Fairchild's lacto-bacillary tablets have proven efficacious. In fact, the writer believes that these tablets are of great benefit to those patients who take egg and milk between meals, if a tablet is taken a short time after the ingestion of the egg and milk.

It may be of interest to state that under the foregoing adjuvants the writer has seen cases gain a pound a week. In this connection it may be well to observe that too frequently the trouble has been that the treatments have not been of sufficient duration. It is not reasonable to expect that fifteen or twenty minutes twice weekly can effectually check morbid processes which are going on 168 hours per week. Frequent and longer treatments are advisable, and the writer has in extreme cases given treatments of from one hour to an hour and a half daily, decreasing the length and frequency as the case improved.

For the past two years he has been employing an apparatus which combines x-ray, high frequency, autocondensation and the production of ozonated oils. As illustrative of the results obtained with the combined method of treatment, the writer desires to cite three cases:

Case 1. Miss B., aged 16. This patient had suffered for a year from a pain in the left lung and constant hacking cough. About one month prior to coming to the office for examination profuse night sweats had begun, accompanied by swelling of the extremities. The physical examination showed on inspection the left apex to be stationary, with dullness over the entire upper lobe and increased vocal fremitus.

The x-ray examination revealed a marked shadow over the entire upper lobe, increasing in density toward the apex. This was corroborated by the radiograph, but no cavities nor localized areas of consolidation in the lobe were visible.

This patient was treated daily for three weeks, and upon the first day of treatment the evening temperature was 103° F. After the third day the night-sweats disappeared, and the temperature was reduced to normal, and the patient made an uneventful recovery. She returned to her home, which is out of the city, but presented herself for treatment twice a

week for two months. At the end of that time a fluoroscopic examination was made. This revealed that the entire left lobe had cleared up, apparently resolution had taken place and the movement of the chest was normal. Needless to say that in this case no breaking down of the lung tissue had been evident.

Case 2. Mr. H., aged 32. This patient was by occupation an ice-wagon driver, and three months prior to presenting himself for treatment hemorrhages from the lungs had begun, accompanied by cough, expectoration, marked anemia and loss of weight, this latter being to the extent of forty-two pounds in three months. In both this case and the one previously cited the sputum had been reported by the Bureau of Health laboratory to contain tubercle bacilli.

The x-ray examination showed a shadow in the right middle lobe, with a small dark area about the centre of the lobe. He received three treatments per week, and after the second treatment the night-sweats, which had been present but not profuse, disappeared. The patient gained in weight rapidly, the cough ceased and at the end of three months he was discharged as cured. The writer subsequently learned that six weeks after he stopped treatment the patient successfully passed an examination for life insurance.

While in acute ailments it is possible to employ a single form of physiotherapy, in as serious a disease as phthisis pulmonalis, it is incumbent upon us to meet the constantly changing conditions, not alone by a discriminating choice of modality but by individualizing the dose and duration of treatment. It is as necessary to differentiate between the various modalities and select the one suited to the case as it is to prescribe the proper remedy, and it is as rational to endeavor to practice medicine with, let us say, *nux vomica* as our sole drug, as to treat our patients by physiotherapy equipped only with a small coil. *This point is worthy of special emphasis.*

In conclusion, the writer would most earnestly protest against the expectant method of treatment, and would urge that the phthisis cases who are shivering in forlorn shacks, pouring eggs and milk into rebellious stomachs, be no longer excluded from rational treatment, but be given at least a "fighting chance" for life.

The great white plague has become a national menace—a grave peril—and it is not reasonable to place our sole dependence upon eggs, milk and air, trusting that the consumptive's vitality may be built up, and that it may somehow overtake and conquer the disease. Was ever a race run under such a hopeless handicap?

Discussion.

Dr. F. C. Tice, of Roanoke, Va.: I think that Dr. Yale has brought out a very important matter for the consideration

not only of this body but the profession at large in the point that he made about sending patients to sanatoria, where they have little medical treatment, and rely on light and fresh air for recovery. It is well known that light and fresh air have a stimulating effect; they increase the circulation and bring the phagocytes into more close relation with the bacilli; at the same time that it does that it is also increasing the propagation of the bacilli, and it has frequently happened that people have gone to these places who were not considered hopeless, but who were regarded as having a pretty fair chance, and yet after a few weeks they have suddenly gone down very rapidly. The thing that has happened has been that with this increase of circulation and the increase of the bacilli, the phagocytes have not been able to destroy the bacilli in such proportion as to overcome them, and with the increased production of antibodies and the increase of the bacilli the patient is overwhelmed. But when you take a patient, as Dr. Yale suggests, and subject him to the action of the x-ray, you inhibit these bacilli, and at the same time with your other treatment you facilitate the circulation, you bring the phagocytes in and they destroy the bacilli and form the antibodies without having this great increase in the propagation of the bacilli themselves, and the patient is saved.

Dr. G. E. Pfahler, of Philadelphia: I do not think we should let this paper pass without a little criticism from the standpoint that the author is condemning methods that have been tried by masters in this field and that have proved a success. Shall we as a body turn round and condemn the very methods that have cured those patients? Shall we tell these old masters that this is all wrong, that we young men have come in here with new modalities and a lot of machines and turn on a certain current and cure these cases? It is all rot. It may do some good, but you cannot get away from the fact that the best method is food, fresh air, sunshine and all the other agents that help to build up the health of the patient. We are doing wrong as a body of special workers in attempting to condemn men who have worked so faithfully and honestly and scientifically. This generalization gets on my nerves. Let us do something we can show. The general statement of giving a patient daily treatments for an hour is not definite. That will do very well if there are no rays coming out of the tube, but if you get the rays that we get sometimes, an hour would put your patient out of business.

Dr. W. T. Bishop, of Harrisburg: It seems to me that these two or three cases, as compared with the thousands of cases that have been benefited by the expenditure of millions of dollars by the State of Pennsylvania certainly does not justify us in condemning without question their manner of treatment. I don't doubt what the doctor says, but these

other people have thousands of cases to prove that their treatment is all right. Let us admit that they are all right, and let him go ahead and do as he pleases. Thousands of cases ought to be conclusive evidence of success. I have known a number of cases that have gone to the sanitariums of the State of Pennsylvania that were benefited.

Dr. William B. Snow, of New York: There are some things in Dr. Yale's paper with which I agree, if they do differ strongly from the experience of men who stand high in our councils. For instance, with regard to overfeeding. There is nothing worse than to stuff a consumptive patient. There is a certain amount that the alimentary tract can digest and assimilate. Everything above that amount goes for toxemia. Very many cases of tuberculosis had their origin in toxemia. No one finds anything wrong with the fresh air provided you feed the patient properly. Dr. Gibson, of Denver, reports that 85 per cent. of his patients treated during the past eight years are still living, and only 15 per cent. are dead, and a large percentage of those were cases of second and third degree tuberculosis. Though he feeds his patients pretty liberally, they are certainly an argument in favor of the x-ray scientifically applied. He lays down the rule that exposures should be made on alternate days, changing the surface to be exposed so that there are four-day intervals in the exposure of one part. This is followed up with fresh air, light and other methods.

Dr. J. J. Kindred, of River Crest, Astoria, L. I.: May I ask the question for my own information if it is not true that Dr. Gibson pursues all the methods of treatment and takes all the precautions which usually are pursued by the routine and regular method of feeding and fresh air, in addition to any other method?

Dr. Snow: Yes.

Dr. Kindred: That, of course, leaves open a wide difference of opinion as to the question which of these methods does good in such cases.

Dr. Emil Heuel, of New York: During my term of hospital service from 1887 to 1903 we had an annual admission rate of 2000 cases and a daily average attendance of about 450 tubercular patients. These comprised all forms, but mostly pulmonary. Naturally we tried all possible methods of medication and food. A milk diet to excess by a so-called milk specialist, giving excessive ingestion of milk produced the usual gastric intestinal disturbances—vomiting and diarrhoea. Patients nevertheless gained very rapidly anyway. This continued, but eventually they failed quite rapidly; collapsed and died.

One private patient gained no less than 112 pounds in eleven months, but owing to personal neglect died three

months later on returning to her home from an outdoor country life.

I would suggest rational treatment. I do not think that the members of our society from the City of Brotherly Love are treating Dr. Yale right. He is entitled to his opinion, which should be respected. We should help him along—he may only be at the beginning of his work.

Dr. Herbert F. Pitcher, of Haverhill, Mass.: I would like to say just a word in regard to the use of radiography in the diagnosis of pulmonary tuberculosis. In the Boston City Hospital, under the supervision of Dr. Williams, there are nearly 10,000 radiograms with the history of each case of tuberculosis. Those radiograms are on file, and whenever a case reports the radiogram is examined and the history looked over. At the same time the patient is examined with the fluoroscope. But the radiograph is kept on file for future use. I think they attach more importance to the radiographic and fluoroscopic examinations than they do to the physical examination.

Dr. Anthony Bassler, of New York: I simply want to say that in conversation with Dr. McSweeney, who has charge of the Otisville Sanitarium, he stated to me that he ascribed the good results which they are getting from the sanitarium treatment of tuberculosis to the following: Equal warmth of the patients, fresh air, sunshine, regular living, rest, isolation from other people, cheerful surroundings and the encouragement of other patients that were getting well. I said to him: "What about foods?" He said: "We don't care what they eat." I said: "Don't you give them milk and eggs in large quantities?" He said: "No; we let them eat anything they want as long as they eat enough to nourish them sufficiently." He gave them eggs and milk if they wanted them, but did not stuff them.

Dr. F. Howard Humphris, of London: With regard to the question of radiosopic and fluoroscopic examinations of the lungs, I am very strongly of the opinion that the fluoroscope is of more value than a radiogram. No picture that we get in a radiogram is equivalent to a fluoroscopic examination. Any examination which has not been preceded by the operator being in the semi-obscurity of the dark-room for about ten minutes may be productive of error.

I wish to say a few words with regard to the sign of deficient illumination, as Dr. Knobel calls it, who owned a sanitarium in England. He uses a soft tube with just enough illumination to go through the chest. With such a tube, on deep inspiration, as you all know, both apices will light up. Where there is an early phthisis on the right side, for instance, that side will not light up. The difference is easily seen.

I think the remarks of Dr. Pfahler about a conservative attitude are right. Even when we are right and know it and have proved it a thousand times, I still say we should not tell all we know, because we shall not get the sympathy of the profession as long as we say all we know. We must modify what we say. We must say we *think* we can do so and so. How much more is that true when we have got only a few cases behind us. The policy of this Society, I think, should be one of very strong conservatism.

Dr. Yale, in closing: I regret that some of the fellows of the Association have so greatly misconstrued the theme of my paper. I stated: "My purpose is by no means to condemn tubercular sanatoria, properly equipped and conducted, but I do most emphatically protest, not against the institutions, but against the expectant method employed, which simply awaits results."

The open-air method of treatment, combined with proper feeding, is, as we all know, beneficial in a great many cases. Dr. Pfahler said: "The best method is food, fresh air and sunshine, and all other methods that help to build up." This is precisely what I desired to emphasize in my paper, the "other methods," particularly the use of the x-ray, especially as this seems to be the only modality which tends to eliminate the cause of the disease.

I regret exceedingly that I am unable to give the milliamperage of the current used to light up the x-ray tube, as, with the apparatus I am now using, thus far no meter has been devised to measure the current. I can state, however, that the tube is one which will "back up" about a ten-inch spark-gap on the static machine, and from four to seven amperes of primary current are required for the coil. I have a record of one case who received one hour's treatment daily for seventeen consecutive days, and another who was treated for thirty minutes daily for nine weeks of six days each. It is only, however, in the stage of acute exacerbation where I have found the long treatments frequently repeated are required to produce the necessary results.

I would be glad to show to a committee from the Association cases which I now have under treatment and have them examine radiographs and record of cases discharged as cured. The three cases were cited simply to illustrate the effect of the treatment on different stages, and I did not deem it necessary to give more than that part of the history and record which bore on the particular phase of the case I wished to illustrate.

I should also like to state that over one-half of the cases I have treated have been in sanatoria, where the old-fashioned methods were followed, and that every case treated had been previously treated by the fresh air and superfeeding method for from six months to six years without improvement.

Progress in Physical Therapeutics.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M.D.

Routine Postoperative Treatment of Cancer. By Clarence Edward Skinner, M.D., *New York Medical Journal*, November 4, 1911.

The article is very timely and to the point on this subject. It is very true that the surgeon ordinarily has great antipathy for the x-ray and the men who use it. They are more or less honest in their opinion of the uselessness of the x-ray, and have to be taught to have it driven into them. Time alone, with much patience and constant effort on the part of the radiotherapist, can force the adoption of x-ray therapy to its rightful place. Vituperation of the surgeon does no good, and denunciation of the x-ray worker by the surgeon is useless. The main trouble with all of us who use the x-ray in cancer and other conditions is that we have made mistakes. We have not cured patients that we should have cured, and we have had much to contend with. In the first place, we did not perhaps know as much about the x-ray as we would have known; next there was a surgeon, or some other well wisher, always ready to tell the patient it was not doing her any good, but killing her as fast as possible; that the very relief of the pain she felt was only the powerful effect of the ray deadening her tissues so that the disease could get a better and more desperate hold. These things, the money to pay the cost of treatment, time and the co-operation of family and friends, all count in the cure of cancer by the x-ray. It takes time and patience. There is no question that when the x-ray treatment of cancer is left more entirely to the competent x-ray operator instead of to any one who has a machine that will make some kind of an x-ray, the statistics will then be better and the surgeon will not have so much cause for doubt.

The writer says that "the widespread and bitter antagonism to x-ray therapy in cancer on the part of perfectly sincere and honest members of the surgical profession seems to me to demonstrate that a grave duty to humanity confronts the roentgenologist. The inauguration of an earnest, vigorous and persistent campaign for the enlightenment of the lamentable ignorance which withholds from the cancerous sufferer the beneficent potentialities of prompt, thorough, post-ablative roentgenization; a campaign which shall consist of repeated

presentations of papers before our county medical societies of the many available evidences that the x-ray undoubtedly exercises a positive curative influence over malignant processes" is urged. Skinner takes the ground, and justly, too, that the expense of raying is no more open to criticism than is the expense of operation, as all is lost if the cancer recurs and the patient dies. He insists on operation and total ablation in the majority of instances, but that post-operative raying is equally important.

Diverticula of the Urinary Bladder with Special Reference to Roentgen Ray Diagnosis. By J. M. Garrett, M.D., *Surgery, Gynecology and Obstetrics*, September, 1911.

There were two diverticula cavities in bladder, both most beautifully shown by accompanying skiagraphic prints. He gives an interesting detail of the case. The treatment consisted in using a boric acid solution as a wash, urinary antiseptics and medical tonics as indicated. This was followed by a daily high-frequency treatment and also the x-ray to the bladder, alternately over pubes and perineum. The case, a man over 70 years, was sent away very much improved in every way.

PHOTOTHERAPY.

EDITED BY HERBERT F. PITCHER, M.D.

Incandescent Light as a Therapeutic Agent. By F. Howard Humphris, M.D., F.R.C.P., Edin., *Archives of the Roentgen Ray*.

The light which Dr. Humphris uses consists of a 500-candle-power incandescent electric globe, with a carbon filament which carries about twelve amperes of current. He emphasizes the point that the lamp must be a *single* carbon filament capable of carrying twelve amperes, and not several smaller lamps which in the aggregate give the same candle-power. The quality of the light varies with the intensity of the producing force, whilst the heat emitted is always the same in quality, varying only in amount. The average wave length of the light varies with the current strength; as this increases, there is an increase in the luminous rays, principally in the blue-indigo-violet frequencies. Moreover—and this is a point of practical experience—a cluster of small lights, though it amount to 500 candle-power and even more, will not produce the effects of the single filament carrying the larger amperage. The globe carrying the incandescent filament is surrounded by a bright polished metal hood, the

whole being swung on an iron trolley, and having a counter-weight so that easy movement in any direction is readily obtained. His method of applying the lamp is to sway it slowly backward and forward over the affected parts for about twenty minutes to half an hour. The distance between the skin of the patient and the lamp depends a great deal upon the tolerance of the patient, and this toleration in its turn will vary with the severity of the pain which causes the patient to seek relief, and with other modifying conditions. The light must in all cases be applied directly to the skin; no good can be accomplished if the light pass through any clothing, however diaphanous. The application is not painful, but the heat from the lamp is apt to become unpleasant. This may be obviated by immediately swinging the lamp away on the first complaint of the patient, or by brushing with the hand that part of the surface being treated. The number of applications, their frequency and the duration of the whole treatment depends so much upon the amount of pathological change present in each individual case that no time limit can be laid down. The physician must be guided by the results obtained. The author advises daily applications of the light if the pain can be relieved and held in check by one daily application. This should be continued until it disappears entirely. In some cases, at the beginning, the applications may have to be given twice daily, while in other cases thrice weekly will suffice. A case of simple lumbago may be expected to clear up in a few days, while a case of sciatica of year's standing may take several weeks. As a general rule, the longer the duration of the complaint, the longer will it be necessary to continue the treatment—*i. e.*, the longer it will be before the pathological condition which is causing the trouble will be replaced by the physiological healthy state. There should be no sense of fatigue or depression following an exhibition of the rays. For this reason, the first application should be of less power—*i. e.*, the lamp farther away—and should be of shorter duration than the full therapeutic dose. In general, a short, sharp application of the light is better than a longer application at a greater distance.

He summarizes the physiological effects of this form of phototherapy: 1. Dilatation of superficial vessels and glands. 2. Removal of venous stasis and promotion of normal circulation. 3. A bactericidal action on superficial germs. As a practical result of these principles we get: 1. Relief of pain. 2. Restoration of functional activity both in the skin and in the deeper glands.

He points to the broad field open for the clinical application of the high candle-power lamp, and how many indications there are for its use as in the treatment of some skin diseases, notably acne, eczema, psoriasis, tinea, sycosis, syphilitic

and other ulcers, he has found this succeed where other treatment has only yielded disappointing results. In the relief of pain he thinks this form of treatment stands preeminent in the armament of the modern electro-therapist. He thinks that where, after a scientifically applied exposure of this light, no relief is obtained, it may be taken that the case should be promptly referred to the surgeon; that there are some cases where the light will cause the pain to become more severe. This differentiates those cases of retained, walled-in pus which have gone beyond the power of the phagocytes, and which call for immediate operative interference.

The cases of pain which are more particularly benefited are rheumatic and rheumatoid disease, sciatica and other forms of neuritis, lumbago and certain functional diseases of the digestive system, especially gastric irritability and pain.

In certain classes of neurasthenia and insomnia he passes the light up and down the spine for ten or twelve minutes, and then applies it for a similar period to the abdomen; this produces marked relief and eventually a cessation of all symptoms. In speaking of its power to abort a bubo or carbuncle before pus has formed, he mentions a diagnostic fact which has been corroborated by other observers—if the pain is relieved in ten or fifteen minutes after applying the light it is quite certain that repeated applications will effect a cure; whereas if the pain becomes worse—and this will occur in the first few minutes—it is certain that nothing but the surgeon's knife will relieve the condition.

He speaks of the light as being of great benefit in certain abdominal pains, sometimes ill-defined or indefinite and sometimes more distinct and localized pain over the region of the appendix. He believes that he has aborted certain cases of incipient appendicitis by the early use of this light; and also subacute long-standing cases of pain which, though not severe, are more or less constant. Some of these cases depend upon a chronic congestion, which is relieved by the dilatation of the cutaneous vessels, and thus the way is prepared for the restoration of a better circulation.

He mentions two cases of recurrent pleurisy of phthisis, in which the improvement was most marked, the breathing became easier the first half hour and in both the trouble cleared up without the patient's having to go to bed, and there was no relapse as far as the writer knows.

As an adjunct to other forms of treatment it has proved most useful. As a prelude to the static wave current it not only adds to the comfort of the patient, but enables the physician to administer a stronger current without discomfort and to obtain a more permanent and satisfactory result. Used in conjunction with the vacuum tubes it seems to greatly enhance their value in skin affections.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M.D.

Fatality of Text-Book Hydrotherapy—A Warning. By Simon Baruch, M.D., *Medical Record*, July 1, 1911.

Any warning that would be brought to the attention of the profession by that nestor of American hydrotherapy, Dr. Simon Baruch, would be well worthy of their consideration, for Dr. Baruch brings to the consideration of hydrotherapeutic subjects a practical experience of "half a century at the bedside." The article here reviewed takes for its subject the treatment of thermic fever by means of the various forms of hydrotherapy. Says the author of the article: "The idea that the coldest bath is the most antithermic and therefore the most useful has been demonstrated to be as fallacious in thermic fever as it has proven to be in typhoid fever. . . ." An unbiased review of the history of this subject leaves no room to doubt that the recognition of vasomotor depreciation as the chief danger in typhoid fever, and the clinical fact that this menace to life may be most effectively met by the systematic cold-friction bath, demonstrated with a view to sustaining the nervous system and circulation, rather than for temperature reduction, has resulted in the reduction of mortality from 20 per cent. to 2.7 per cent. (Vogl). That a corresponding change in the mortality of thermic fever has been achieved by a similar judicious change of water treatments is proven by the report on 500 cases of thermic fever published in the *Medical News* of July 24, 1907.

There is no question but what the medical profession is becoming more and more interested and attracted by the use of hydrotherapy in acute and chronic diseases. Dr. Baruch's arraignment of the average text-book as being woefully deficient in its use of water as a treatment is true. He says: "I have hitherto refrained from pointing out that many lives have been lost by reason of the faulty teaching of text-books. Their reiteration of conditional methods, their indifferent systems regarding the technique, and, what is most damaging, their failure to take cognizance of published results of hydrotherapy.

"That in thermic fever many lives have actually been sacrificed by reason of unfamiliarity with the simple principles and methods of hydrotherapy I am loath to confess, but clinical records, gathered in our best hospitals, complete this conclusion. They are reluctantly published as a warning that faulty hydrotherapy may result as seriously, if not so fatally, in other diseases, which are more frequent, and that writers on practice need to search the literature on hydrotherapy for additions to their resources."

Dr. Baruch calls attention to the fact that the most popular American text-book on practice has reiterated in each of its *six* editions the statement that twelve out of thirty-one cases, treated in 1887 by ice-packs, is the best result to be expected in this grave disease, and that the vastly superior achievement of a mortality of 6 per cent. of 197 cases treated in 1896, by cold affusions, appears to be unknown to all authors within my reach, despite the publication of this data in a prominent medical journal. "The futility, nay, the reprehensibility, of depending upon the average text-book for information on hydrotherapy is clearly demonstrated."

Of the truth of Dr. Baruch's statement there can be absolutely no doubt. From a moderate personal experience, from a wide acquaintance with other physicians and their methods in treating this condition, the editor of this department is prepared to state that Dr. Baruch has indeed dealt mildly, justly, and fairly with the delinquencies of medical text-book writing. No one acquainted with the physiological action of hydrotherapy and best clinical application to the case in hand would for one moment be guilty of the treatment of cases of insulation, heat stroke, thermic fever, in the matter described in the average work on practice, and usually followed by the family physician, who is generally the first man to reach the case.

In my work, "Practical Hydrotherapy" (1909, page 412), I have the following to say in regard to the application and its rationale: "Where the attack is sudden, the fever high, and circumstances do not permit the removal of the patient's clothing, no attention should be paid to his personal apparel, but buckets of cold water should be poured or dashed over him from a distance of four to five feet, while several persons rub his arms, legs, and trunk. . . . The rationale of this procedure has been so often demonstrated in the application of the cold bath in typhoid fever and all conditions of pyrexia that it should have taught the profession the need of its use. There is present a depreciation of the vital forces of the nervous system, and the greatest benefit that is derived from the use of the bath is *as a nerve stimulant*, that of an antipyretic being secondary. The application of cold accompanied by friction dilates the blood vessels of the skin, draws the blood from the brain and viscera, favors heat elimination, causes tonic contraction of the blood vessels, powerfully stimulates the vasomotor system, and by reflex effects lessens heat production. That the enormous vascular area of the skin is capable of rapidly carrying off the accumulated heat is well known, and the reduction of temperature by cold applications depends largely upon the excitation of the cold and friction upon the peripheral nerves and blood vessels, rather than upon its direct antithermic or heat-reducing power. The mechanical effects in the production of these results are immediate,

and for this reason it has been suggested that the water should be thrown or dashed upon the patient in order that we might get the stimulation of the force of impact."

The personal experience of the editor of this department would lead me to add an additional item of warning to that of Dr. Baruch, to the effect that not one out of a number of cases investigated were ever advised by the physician in charge (save the editor) to continue a careful convalescent treatment. Of this I have to say the following: "The after-treatment is important and should consist of daily graduated cold applications, care being taken to thoroughly cool the head before each treatment. As a result of the heat-stroke the patient's nervous system and vasomotor mechanism have received a severe shock, and we often find traces of injury to nerve functions, such as headache, vertigo, insomnia, nervous irritability, altered disposition, tender spine, indigestion, anemia, irregularity of respiration and heart action, morbid dreads, mental excitability, or an incapacity to stand heat or the sun's rays. In the after-treatment it is essential, therefore, and advisable that the patient be put upon a light diet; that he refrain from eating meat during warm weather; that he be compelled to drink daily at least one-half gallon of water; that all digestive conditions and constipation be corrected; and that all measures be continued which will stimulate and regulate the nerve functions and place him physically and nervously in prime condition. For this purpose institutional treatment should be commenced immediately after the attack and continued *during the period of hot weather and long into the fall or winter*. Nothing is superior in these cases to the careful and persistent use of the electric-light bath for several minutes, keeping the ice-helmet on the head, followed by the horizontal rain bath at 100° F. for one minute, reduced to 65° for one-fourth minute. As soon as reaction is well established and resistance increased we may add the cold jet douche at 60° F. up and down the spine, paying especial care to the cervical region. In very sensitive cases the electric-light bath may be omitted and the treatment given as outlined, the patient wearing the ice-helmet during the rain bath. The author has had the pleasure of seeing a number of cases entirely freed from unpleasant sequelæ by the adoption of these methods."

HIGH FREQUENCY CURRENTS.

EDITED BY FREDERIC DE KRAFT, M.D.

Two Cases of Extensive Primary Papillomata of the Bladder Treated by Means of the Oudin Spark. By Edwin Beer, M.D., *New York State Journal of Medicine*, September, 1911.

In this paper the author reports in detail a new method of attacking neoplasms of the bladder described by him in the *Journal of the American Medical Association*, May 28, 1910. (We abstracted these cases in a previous number of this JOURNAL.)

Case No. 1 was a woman, aet. 81, whose condition had been considered inoperable. A large papillary growth of three confluent tumors surrounded the right ureter. "To remove the growths and reimplant the ureter would have been too severe a strain for this anemic old woman." "In eight seances, aggregating 13¼ minutes' application of the Oudin current, the tumor was painlessly destroyed and the patient has been completely restored to health. There is no sign of recurrence." July 7, 1911, cystoscopy shows normal bladder.

Case 2, a 66-year-old German woman. Trouble began ten years ago, had several attacks of haematuria, the second of which lasted three months (June, 1907). At this time she was cystoscoped and a papillary tumor the size of a hazel nut was found. April 6, 1910, she was admitted to Mt. Sinai Hospital. She had very bloody urine, urination every half hour for nine weeks, had lost much weight, and had become very weak and intensely anemic. Haemoglobin, 45 per cent. In this patient there was a fair-sized sessile growth which was bleeding very actively. The very first application and the very first treatment controlled this, so that the urine was absolutely clear twelve hours after the treatment and has remained so ever since. July 7, 1911: Cystoscopy shows a normal bladder. The high-frequency applications were made April 6, 1910, for four minutes; April 11, 1910, for four and one-half minutes; May 25, 1910, for five minutes (thirty seconds at a time to each remnant of the growth); June 8, 1910, for thirty seconds.

Beer has treated successfully five cases of primary papillary tumors of the bladder, aggregating nine distinct tumors, with this new method. He has also treated two cases of recurrent papillary tumor of the bladder. One case is still under treatment. The original tumor was excised some years ago and was diagnosed as carcinoma by a competent pathologist. The other case could not be adequately treated, as the old supra-pubic wound opened up and the patient developed a fatal renal insufficiency. Two undoubted cases of carcinoma of the non-papillary type were treated, with negative results. Beer believes that this treatment will supplant all other methods because of its greater simplicity and its great effectiveness. The instruments used are an Oudin resonator, a catheterizing cystoscope and a heavily insulated copper electrode, which is a six-ply copper wire thoroughly insulated and cut off squarely at the end. The spark-gap in the muffler is between one-eighth and one-quarter inch.

After the bladder has been washed and then filled with distilled water, the cystoscope armed with the electrode is introduced. The electrode is pushed in amongst the villi and the current turned on for fifteen or thirty seconds. If the electrode touches the bladder wall it causes pain, but otherwise not. Repeated applications at different spots destroy the growth rapidly, and as it disintegrates it is usually voided in small pieces. No spark is seen if the electrode is properly placed among the villi. While the current is on gas is freely generated and bubbles out of the growth. If the point of application is superficial, blanching of the tissues around the point of application occurs, and at the spot where the electrode rested the tissues are blackened. As the electrode is withdrawn from the growth very frequently it is adherent to the villi, the whole tumor moves with the electrode, and as it comes away a small mass of tumor tissues is baked to its tip. Bleeding rarely occurs. An application of the current to the same spot usually controls this. With proper care no severe burning of the bladder wall should ever happen.

High-Frequency Cauterization of Bladder Lesions. By E. L. Keyes, M.D., *Interstate Medical Journal*, October, 1911.

The writer in this paper reports that since the publication of a preliminary paper upon the treatment of bladder tumors by the high-frequency currents a year ago, it has been found that the Oudin current is far more effective than the d'Arsonval current which he was using at that time. The instruments he employs are made by Wappler, produce a current of rapid oscillation, high amperage and low voltage. He employs a cystoscope with channels for two ureter catheters and introduces an insulated wire into each. He uses an extremely small spark-gap at the generator, because a large spark-gap, by increasing the voltage, causes unnecessary pain and excites within the bladder so violent a destruction of the epithelium in contact with the wire as to obstruct the field by the production of epithelial detritus and hemorrhage and cuts the operation short by burning off the insulation of the wire.

The patient is prepared for cystoscopy in the usual way. The cystoscope introduced, the tumor inspected, one of the wires is pushed into the tumor, the current turned on for a brief space, and the patient is asked if he feels it. If the wire has slipped from among the villi and come in contact with the wall of the bladder, or if there is a short circuit anywhere, the patient will feel pain; but if the wire is solely in contact with the tumor no pain is felt.

The frequency with which these burns may be repeated depends chiefly upon the condition of the patient. Usually

an interval of two weeks has been allowed. At the end of seven days the line of demarkation between a burned spot and an unburned spot is sufficiently clear to show where to make the next burn. Complete detachment of the slough takes place in from two to four weeks. The only accidents produced by the treatment have been: 1. Detachment of the insulation. 2. A single case of very severe hemorrhage which subsided after two days' rest in bed. This occurred a week after a rather prolonged burn. 3. A reaction of the bladder wall due to the irritation of the current. The mucosa swells up in such a way as to simulate an infiltrating carcinoma. Several weeks' intermission in the burning will suffice for the subsidence of this.

The results obtained from this treatment in papilloma of the bladder have been most gratifying. The effect upon infiltrating carcinoma is apparently *nil*. Keyes has tried the method suggested by Dr. Beer upon two cases of prostatic hypertrophy with no result. Three cases of bladder ulceration have also given unsatisfactory results. He reports twelve cases of bladder papillomata treated by this method. Of these two are still under treatment. Eight with thirteen tumors have been cured. The cures of individual tumors have been verified nineteen months after, one year after (two tumors), ten months after, nine months after, seven months (two tumors). Two very small tumors that were burned out once were found by another physician to have relapsed nine months after the burning.

RADIOGRAPHY.

EDITED BY FREDERICK M. LAW, M.D., NEW YORK.

Foreign Body in the Orbit Discovered by the Magnet After Failure by the X-Ray. By Frank A. Morrison, M.D.,
The Journal of the Indiana State Medical Association.

Dr. Morrison cites a case in which a piece of steel, the size and shape of the nail of the ring-finger and weighing seventy-five grains, was imbedded between the upper surface of the globe of the eye and the roof of the orbit. Two radiographs were made and failed to show the foreign body, but the magnet demonstrated its presence at two inches distant.

It hardly seems possible to me that a piece of steel of this size and enormous weight could escape detection in a radiograph. Steel is so much denser than bone that a very small piece, considerably less than the size of a pinhead, will show. Even though this piece of steel were lying with its edge perpendicular to the source of the ray, a stereo-

scopic radiograph, made with a very short exposure, certainly should show its presence. It is absolutely essential that two plates at different angles be made in any foreign-body case, and the time of exposure short enough to overcome any motion of the eye which will blur the image. In this case if the edge of the foreign body is presented toward the tube with the head in a lateral position, an antero-posterior view would most assuredly show the steel.

This case demonstrates very clearly the absolute necessity of care and thoroughness in the technique of a roentgenographic diagnosis. [F. M. L.]

TRANSLATIONS.

New Researches on Radium Therapia for Tuberculosis. By Dr. S. Bernheim, Paris. Read at the French Medical Congress, 1911.

From a long memorandum well documented the author arrives at the following precise conclusions:

1. It is possible to inject radium in very small doses into animals and also into the organism of human beings. For a long time after the injections the organic humors remain radioactive, and this radioactivity constitutes a real state of defensive asepta of the organism.

2. With a special radium salt, the dioradin discovered by Drs. de Szendeffy and Prof. Béla Augustin, of Budapest, it has been possible to stop the progress of the infection on tuberculized animals. Even the most virulent cultures of the Koch bacilli have been stopped in their development by the influence of dioradin.

3. The result of different clinical experiments by Messrs. Danlos, Dominici, Desgrais and Wickham shows that different kinds of surgical tuberculosis have been cured by radium therapia.

4. At the present time dioradin used in a great number of hospitals and sanatoria for the treatment of phthisis gives the best therapeutic results when the chemical composition is used under average circumstances.

5. These average circumstances consist in injecting dioradin into patients of the first and second degree or even of the third degree, but to consumptive patients whose organism is in a good state of resistance. It should be remarked that this composition, although very active, never causes local reaction nor general reaction.

6. Injections of dioradin are given by series of forty punctures. For patients slightly attacked one or two series suffice to stop the progress of phthisis. Tubercular patients severely attacked require from four to five series of punctures. But in any case, even those of a grave character,

without cachexy, the treatment requires a much shorter time than that of a cure in a sanatorium.

7. Out of the 160 tubercular patients cited in this work and taken at different degrees, and submitted to injections of dioradin by different clinical surgeons, there were six deaths and four patients of the third degree where the treatment was inefficacious. That is, ten failures out of 160 cases treated under the most favorable conditions. No therapeutic or hygienic method has ever produced such favorable and demonstrative statistics.

8. In the course of this work the author gives the reason for which serum coming from immunized animals had failed in the antibacillary treatment. For tuberculosis, as for syphilis, in view of this constant failure, recourse must be taken to chemical compositions when they give certain and direct proofs of the action on the disease.

Treatment of Deep-Seated Cancer With Radium. Archives d'Électricité Médicale, July 10, 1911.

Messrs. Dominici & Cheron furnish an interesting report on this subject. Most of it covers ground already familiar, such as the varieties of technique which are commonly practiced and the degrees in which radium-therapy may be combined with surgical procedure. On the general question as to the results which follow radium applications in deep-seated cancers, the authors state that "in favorable cases the irradiation is capable of palliating a desperate situation, relieving intolerable pain, sterilizing infected neoplastic tissue, draining wounds which bleed and suppurate, and occasionally bringing about an entire retrogression from the clinical point of view. To these palliative effects are joined certain others resulting from the suppression of functional troubles which accompany the diminution of tumors. These vary according to the nature and situation of the tumor, and may include a disappearance of oedema, when an ablation of a cancerous breast is followed by transcutaneous irradiations of the neoplastic retro-clavicular ganglions; improvement in deglutition, following upon the introduction of radiferous tubes in soft cancers of the mouth and tongue, or of radiferous sounds in cancers which cause a narrowing of the oesophagus; relief of pain and vomiting in gastric cancers by placing large radiferous plates upon the stomachal region; regularization of defecation and micturition by the introduction of radiferous tubes in rectum or bladder; ameliorations of the respiratory functions by the reduction of tumors of the mediastinum with radiations of the surface, or by the introduction into the oesophagus of tubes giving rays filtered through $2\frac{1}{2}$ mm. of platinum. The authors admit that hard cancers of

the tongue and of the inner surface of the cheek are *noli me tangere* so far as radium is concerned, but other cases in which apparently total regression has lasted for at least a year are numerous. Those results have been obtained most notably in the case of tumors of the uterus, when it has been possible to use large doses of radium (20 cg.). Among the deep-seated cancers which have not recurred for more than two years after radium therapeutic treatment, the authors are able to cite such conditions as scirrhus of the breast (atrophic); epithelioma of the breast, circumscribed or diffused, the clinical form of which made immediate relapse after surgical intervention appear probable; infiltrating glandular epithelioma of the superior maxillary, and lymphadenoma limited to an organ such as the parotid. The term "epithelioma" sometimes conveys a different meaning to the French and English intelligence. The authors define it as a tumor proceeding from the "multiplication of epithelial cells of the skin or the mucosa, or the noble cells of the various glands of the organism." The rarity of radium successes, in their opinion, is no measure of the curative value of radium in deep malignant tumors. It is due to the small amounts of radium at the general disposal, and to the fact that the cases so frequently reach the radium therapist only when they are in a desperate stage. •

STATIC ELECTRICITY.

EDITED BY EDWARD C. TITUS, M.D.

The Electrical Treatment of Infantile Paralysis. By Frank C. Richardson.

The theory as to the origin of infantile paralysis and the establishment of the fact that the propagation of virus is ultimately by way of the blood through the anterior spinal arteries and their terminal branches is confirmed, and the confidence with which we can attack the disease under present enlightened teaching is understood, and we put great reliance in modern electrology to limit the disease and attendant disorders, pending the time when a complete cure can be found, or a preventive, surgical orthopaedics not having as yet solved the problem of functional reparation in infantile paralysis.

The method of treatment is by reducing to a minimum the infirmities resulting, and restoring voluntary contractibility to muscles and combating the atrophic process.

Hypertrophy of compensation as described by Duchene may be obtained by electrization and retard the progress of atrophy in either of two ways—rhythmic faradization or

rhythmic galvano-faradization, the choice of modality depending on result of electro-diagnosis, but effort should be made to reproduce physiological muscular exercise by excitation of progressively increasing and decreasing character, whatever method employed, the undulating faradic and undulating galvanic preferred whenever such modalities furnish an efficacious response.

The rhythm of excitation is important, and owing to variation of curve of increasing and decreasing current the rapidity of wave followed by best response in muscle should be selected. We should guard against too strong shocks and avoid tiring the muscle.

A pad about eight inches square soaked in warm water and attached to back of patient, and small pad well moistened placed on ordinary motor points are suggested for general use.

It is a mistake to postpone electrical treatment too long, and most authors advise beginning about fifteenth day. According to age and timidity of children, difficulties are met in treatment, but patience and kindness overcome them. Great care should be exercised in attempting complete electro-diagnosis at first—first accustoming patient to sensation of electricity and successively lengthening periods from twenty-five minutes' to an hour's duration, remembering that weakened muscle tires more easily than a healthy one, and always stopping short of fatigue.

It seems questionable whether direct application of continuous galvanization over the spinal cord can be efficacious in exciting the vitality of central nerve tissue.

The treatment, if necessary, should extend over years, but for many reasons this is difficult to accomplish, and it would seem desirable that our training schools for nurses should give a post-graduate instruction in the use of electrical apparatus and proper method of administration to those wishing to fit themselves for the special service. Further, a more widely disseminated knowledge of these methods would greatly diminish the number of incurable cripples and add much to the economic value of future generations.

The author is to be commended on the clearness of his article, recognizing the necessity of an early treatment by physical agents—electrical currents—of this unfortunate class of cases. But we would go further and urge the therapeutic application daily over the spinal area of light from a high candle-power incandescent lamp, to be followed by static wave current for twenty minutes along the spine, using a spark-gap of from two to ten inches.

In the later or chronic stage the static induced current may be employed as follows:

A long spinal electrode is placed on the back of the patient and attached to Leyden jar on one side of the machine.

Small strips of metal electrodes (Crooks metal) are placed over paralyzed or semi-involved muscles and bound to parts, and then connected to the outside of the Leyden jar at the opposite side of the machine. The spark-gap is to be regulated so as to induce vigorous but not painful contractions of the involved muscles—the spark discharging about 120 per minute.

E. C. T.

SOCIETY MEETINGS.

THE TWENTY-FIRST ANNUAL MEETING OF AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

REPORT OF COMMITTEE ON STATIC ELECTRICITY.*

HERBERT F. PITCHER, M.D., CHAIRMAN.

The report of the chairman of the committee on Static Electricity will necessarily be a repetition of facts and methods of treatment already known to most of the members of this association. Many valuable methods of treatment are lost to the world from lack of substantiation. The history of medicine is replete with the rise and fall of countless remedies, some to soar skyward for a time until tried in the crucible of all things mundane,—time and experience, when most of them fall with a dull, dead thud. Static electricity has withstood the test since the time of Benjamin Franklin, its efficiency and practical usefulness constantly increasing, until to-day in America, it has arrived at a degree of scientific perfection never attained before.

Some medical men and some manufacturers claim that the era of the static machine is passing because the advent of the high frequency apparatus has largely usurped the field of general treatment covered by the static machine. The men who claim this are either warped in their judgment or they are ignorant of the currents and therapeutic effects of the static machine. It is a fact that no other high potential apparatus has yet been produced which will induce the physical

*Read before the Twenty-first Annual Meeting of the American Electro-Therapeutic Association, September 5, 1911, at the College of Physicians, Philadelphia, Pa.

effects of the tissue pulsation with resulting tissue drainage, as in chronic congestion and induration. "Muscular contraction may be induced in varying degrees from a slight vibratory tremor to a slow heavy contraction or a condition of extreme tetanus. The degree of contraction may be perfectly controlled by varying the length of the spark gap and to some extent by regulating the speed of the machine." Another most valuable current is the long, heavy spark and the indirect spark which can be obtained from the static machine alone. This modality is most efficacious in the treatment of chronic inflammation of joints, chronic neuritis, rheumatoid arthritis, muscular rheumatism with tension of muscles. Dr. Snow has justly asserted, "There is no modality in which the matter of technique is of so much importance as in the employment of static sparks. The knowledge of the relation of inflammatory conditions to the induction of muscular spasms must always be considered as an indication for the application of sparks." As in bronchial neuritis and sciatic neuritis the muscles take on a condition of muscular spasm. The application of sparks following the wave current for the purpose of relieving this tension, judiciously applied, first to one muscle and then to another, is remarkably effective. In order to illustrate the beneficial action of these two currents your chairman will relate a case which came to his office.—Male, 68 years of age. For the past year he had been confined to the house with a severe attack of chronic sciatic neuritis. There was inability to walk, and constant pain except when under the influence of some anodyne. He was obliged to sit up most of the time nights on account of the agonizing pain as soon as he would try to lie down. The pain extended down the tract of the sciatic nerve into the feet. He complained mostly of the calf and ankle. The whole limb was numb. His back was lame, but not painful. About everything in the shape of internal medicine and external applications had been used. He had received some form of electrical treatment previously without benefit, accordingly his faith was *nil*. He was conveyed to the office July 7th, and as he had never tried static electricity, he consented to have that used. A soft metal electrode was applied over the sciatic notch and kept in place by firm pressure. This was connected to the positive pole and the negative grounded. A 12-plate Morton Wimhurst Holtz machine was started with the plates revolving at the rate of 200 revolutions per minute. The discharging rods were one inch apart to begin with; this was gradually increased to three inches. Time of treatment twenty minutes. Afterward indirect sparks were applied to the lumbar and sacral regions and down the course of the sciatic nerve. He returned the next day saying he was much relieved and had rested better than for a year. After his third treatment he forgot to take his cane, and walked quite erect without much limp. He had

been much bent over before taking treatment. He received twelve treatments in all. He eats well and sleeps well, walks as far as he wishes and says he is entirely well. The spark gap was increased to six inches to his great enjoyment, and he would take the longest disruptive sparks with seeming satisfaction.

Another valuable current which alone can be obtained from the static machine is the static induced current. A full description of this current and its therapeutic indications will be found in a published report of the committee on Static Currents. Dr. Wm. J. Morton in his description of this current says,—“It renders a static machine capable of producing all the effects of faradism, doing all the work of the best faradic machines, in addition to the ordinary static effects. This current is particularly valuable in the treatment of local inflammatory conditions as two electrodes are used, it is indicated in many pelvic troubles, a metal electrode being used on the abdomen and a vaginal glass vacuum electrode connected to the other side of the machine. The current can be regulated by the discharging rods and the different sized Leyden jars, the larger jar being placed on the side which requires more current. This current is also valuable during periods of great humidity when it is impossible to administer a spark gap of sufficient length with the wave current.”—*Snow*.

Dr. Francis B. Bishop uses a modification of this current from which he not only gets excellent results in local troubles, but decided constitutional effects which he claims are analogous to the wave current. By this modification the current can be regulated to a nicety in the treatment of superficial diseases, and it also has great depth of penetration, as in congestion of the liver, spleen, etc. In the discussion of this report Dr. Bishop is requested fully to describe his current and the technique.

One more current which is extremely valuable, i. e. the convective discharges or effleuve, or as commonly called brush discharge and spray. By the use of wooden sticks, either green or moistened, a therapeutic effect can be obtained which is of the utmost value in ulcerated surfaces, in old indolent ulcers and many cutaneous diseases requiring antiseptic treatment, as well as stimulation. This so-called “brush discharge” can be regulated to so soft a spray that the eyes can be treated and the sensation felt—like a warm soft breeze, or a bombardment of the surface so strong that it feels like the pelting of hailstones. The blue pencil discharge is still another valuable modification of the same current. In the convective discharge where the speed is rapid the electrical discharges move with great velocity and force. There is at first a contraction and then a dilatation of the superficial capillaries which will greatly relieve inflammatory conditions, like muscular rheumatism, sprained ankle and other like conditions.

The ultra-violet radiations, ozone, and nitrous oxide which are given off in abundance are most valuable in the treatment of infected surfaces. In the last edition of Dr. Snow's work on "High-Potential Currents," he describes what he terms "glass sleeves for use with the brush discharge." These sleeves are slipped over the small prolongation tip which is placed in the end of the ordinary wooden stick electrode, and are designed for application of the brush discharge within the cavities of the body, as to the cervix uteri, in tonsillitis, suppurative otitis media, etc.

Arthur W. Yale, M. D., a member of this Committee, has contributed the following interesting and valuable description of a modality which he calls "The Static Condensed Current."

Sir Isaac Newton once said that he felt as a child picking up a pebble here and there upon the shore of a vast ocean of knowledge. While the simile may be a trifle strong to apply to the present practice of physico-therapy, yet we cannot but feel as we pursue our research, that we are but just realizing its potent forces, and that as Newton, we are standing on the shores of an unfathomed sea.

Not many years ago the treatment of diseases by electricity signified only the use of a galvanic or faradic current. Now the fact is being borne in upon us, that the physico-therapist has at his command almost as many modalities as there are remedies in the materia medica. Furthermore, as the prescriber patiently studies the symptoms until he can select the remedy which the case calls for, so can the practitioner of physico-therapy differentiate between the various modalities, and choose the one which will produce the desired result.

True, many diseased conditions may be successfully treated by a single modality. It is equally true that a skilled surgeon can perform a major operation with a pocket case, or a violinist execute a difficult fantasia on one string. But this by no means argues that the surgeon should confine his equipment to a pocket case, nor that the violinist needs but one string to become a successful performer.

Among the numerous modalities which physico-therapy has placed at our command, the writer would invite your attention to the static condensed current.

Those of us who have been using static machines for some time fully realize that by their use we are obtaining gratifying results. Furthermore, since apparatus and accessories are being constantly perfected we not only find that a static machine is far preferable to a coil in almost all lines of treatment, but that the list of pathological conditions amenable to its use, is constantly increasing. There are, moreover, many diseased conditions which respond more promptly to the numerous modalities of the static machine, than to any other single therapeutic measure.

Auto-condensation, as is well known, requires in most

cases large milliamperage, which heretofore only the largest static machines have been able to supply. It was to overcome this obstacle that there was devised a simple means of condensing the static current, and producing large milliamperage without diminishing the voltage, and it has been demonstrated that by this treatment deeper penetration is attained, and more lasting results secured than by auto-condensation.

The method used is as follows:—Four pieces of double-thick window glass, 24x36 inches, are provided. On either side of these, exactly in the middle is pasted a sheet of lead foil, 12x24 inches, and each pair of plates is then placed in a frame, raised from the floor to a sufficient height, so that the patient sitting in the treatment chair may have the greater part of the body between the two frames. The outside coating of foil upon one side is connected to the positive pole of the static machine, the other to the negative; after which the connecting rods are separated to the fullest extent at which the spark jump is possible.

It was found that this treatment, continued for thirty minutes, would reduce the blood tension from ten to thirty points. But as the vibratory effect so stimulating and beneficial in cases where metabolism was below normal, was not produced, three or four spark gaps of $\frac{1}{4}$ inch were placed four in line between the point of attachment of the connecting cord, and the outside foil on the outer glass. This change apparently increased the output of the static machine and caused the discharging sparks to be thicker. It was then found that the desired vibration was obtained to such an extent, that the raised hairs vibrated in unison with the discharge. As a result of this modified treatment, there was produced in most cases moisture of the skin, amounting even to a general perspiration, and the patient experienced a greater feeling of refreshment than before.

By this modality, the cardiac action was softened, and in general, its action was soothing. In comparison with the Morton wave, the urea is increased, but not to so great an extent as with the wave current, nor are the vibrations as intense as those produced by the latter form of treatment.

This modality is apparently indicated where there is a deficiency in metabolism, and a high arterial tension, and is also extremely useful in that class of neurasthenic patients where heart lesions are present. It is suggested that this treatment be classified between auto-condensation and the Morton wave.

At a time like the present, when appliances are multiplying so rapidly, one hesitates to suggest anything new in the line of equipment, but as the efficiency of the static current seems to be markedly increased by this simple and inexpensive expedient, this addition to the armamentarium of the physiotherapist, is suggested, in the hope that it will prove of great service.

(To be continued.)

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PROPHYLACTIC MEMORANDA.

A pad thus entitled intended for physicians' use has just come to our desk. We believe it would be appreciated by the busy physician. The foreword printed on each pad explaining its use is as follows: "The written word is more apt to be obeyed than oral direction. Responsibility is easy to enforce when set down in black and white.

"Hence the *raison d'être* for these prophylactic memoranda. The busy physician has only to tear off from this pad a slip of directions intended to cover the disease which he has diagnosed, give it to the patient or nurse with the request that it be preserved and read carefully and followed implicitly. The name of the disease (indexed as follows: (A) Typhoid, (B) Measles, (C) Scarlet Fever, (D) Diphtheria, (E) Phthisis—Incipient, (F) Phthisis—Developed) does not appear upon the slip given out by the doctor, and the latter is saved the time and trouble of giving directions that are easily forgotten or misunderstood." Pads will be sent free of all cost to any physician, on request to HENRY B. PLATT (Platt's Chlorides), New York.

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MEDICAL PROGRESS.

LITERATURE WORTH READING.

The value of heat as a therapeutic agent has been so conclusively proven that it will admit of no further argument.

The difference, however, between convective heat in contradistinction to radiant heat is a subject in which the profession generally is interested.

Convective heat is particularly applicable in cases where radiant heat is not indicated and the reverse is quite true. Their differential thermic value is clearly set forth in the October issue of the *Bloodless Phlebotomist*, along with an interesting paper by Dr. David MacIntyre, a Cunard surgeon, upon "Drugs at Sea."

In the same issue of the *Phlebotomist*, Dr. Edward Parrish of Brooklyn presents his methods of treating Tic Douloureux, and Dr. Leverett of Yonkers relates his experience in the successful handling of ivy poisoning cases, which in many instances are quite as intractable to handle as Tic Douloureux.

In addition to these papers, much other interesting and instructive material is given, and it is worth while to write to The Denver Chemical Mfg. Co., New York, for a copy of the *Bloodless Phlebotomist* for October, which they will send upon request.

ANTIDIPHThERIC SERUM AND GLOBULINS.

In their current announcements to the medical profession it is noted that Parke, Davis & Co. give equal prominence to their antidiphtheric serum, which they have produced unchanged for many years, and the newer "globulins," which they have been marketing for a number of seasons.

The globulins, as is perhaps known to most practitioners, is antidiphtheric serum with the nonessential portions eliminated. Compared with the normal serum it provides a corresponding number of antitoxic units in lesser bulk, permitting in consequence a smaller dose, which probably accounts for its apparent growth in favor among physicians.

Both the natural and concentrated products, of course, bear the company's guaranty of purity and efficacy. They are evolved in the blood of healthy, vigorous horses and are prepared under the supervision of expert bacteriologists and veterinarians. The tests, bacteriological and physiological, to which they are subjected during the process of manufacture are thorough and elaborate.

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